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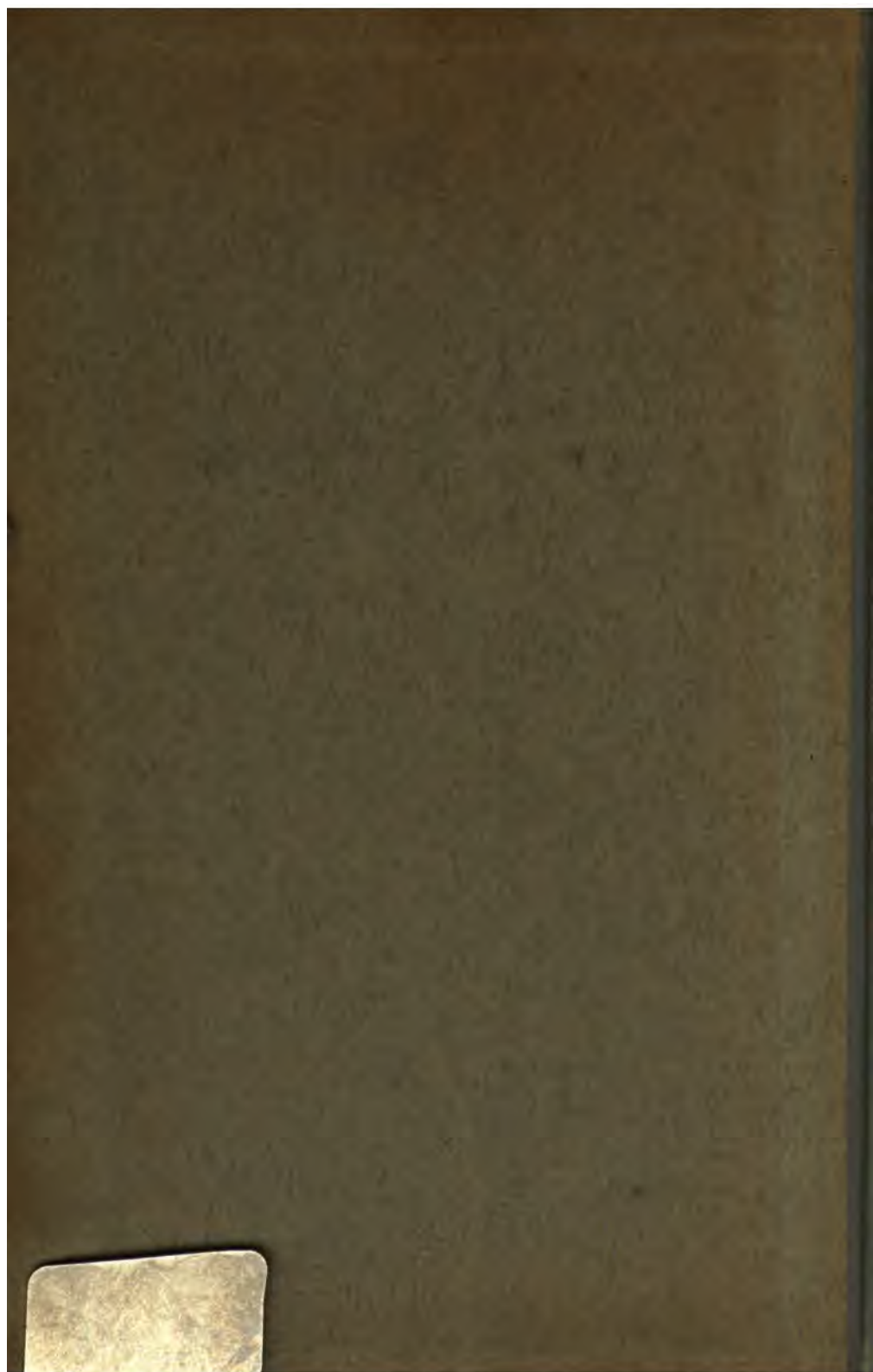
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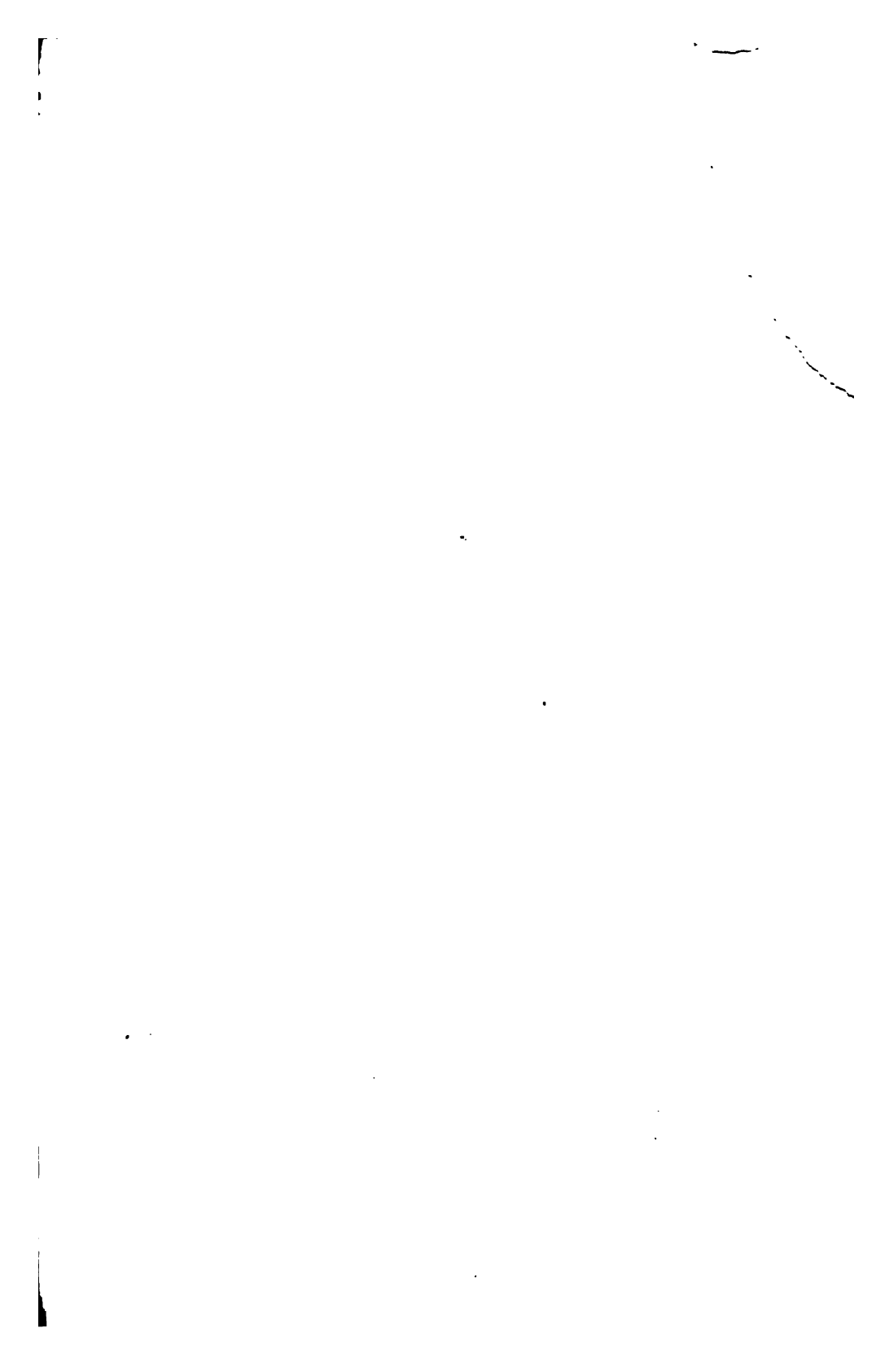
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FREDERICK G. JACKSON



ALFRED C. HARMSWORTH

THE NEW YORK

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A THOUSAND DAYS IN THE ARCTIC

BY

FREDERICK G. JACKSON

KNIGHT, FIRST CLASS, OF THE ROYAL ORDER OF ST. OLAF; HON.
CORRESPONDING MEMBER OF THE AMERICAN GEOGRAPHICAL SOCIETY
HON. CORRESPONDING MEMBER OF THE SOCIETA GEOGRAFICA
ITALIANA, ETC.; AUTHOR OF "THE GREAT FROZEN LAND," ETC.

WITH PREFACE BY

ADMIRAL SIR F. LEOPOLD McCLINTOCK

R.N., K.C.B., F.R.S., LL.D.

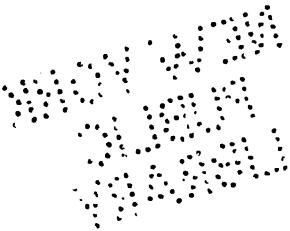
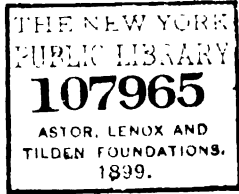
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WITH FIVE ORIGINAL MAPS



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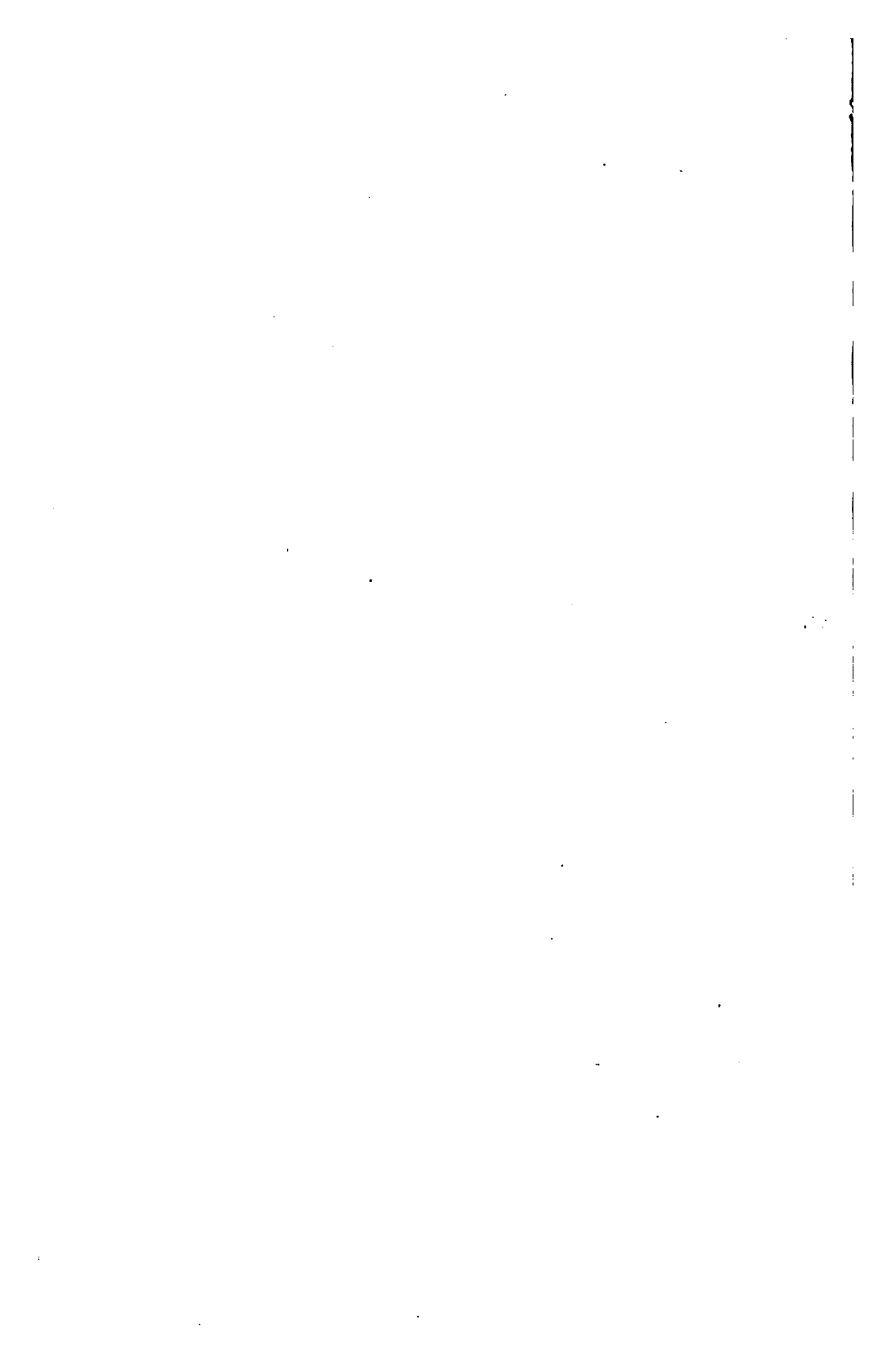
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AUTHOR'S NOTE

THIS is an unvarnished tale of a thousand consecutive days spent in the Arctic, printed almost word for word as it was written—while the facts and impressions were fresh in my memory—in our hut, or tent, when on sledging and boating journeys in Franz-Josef Land.

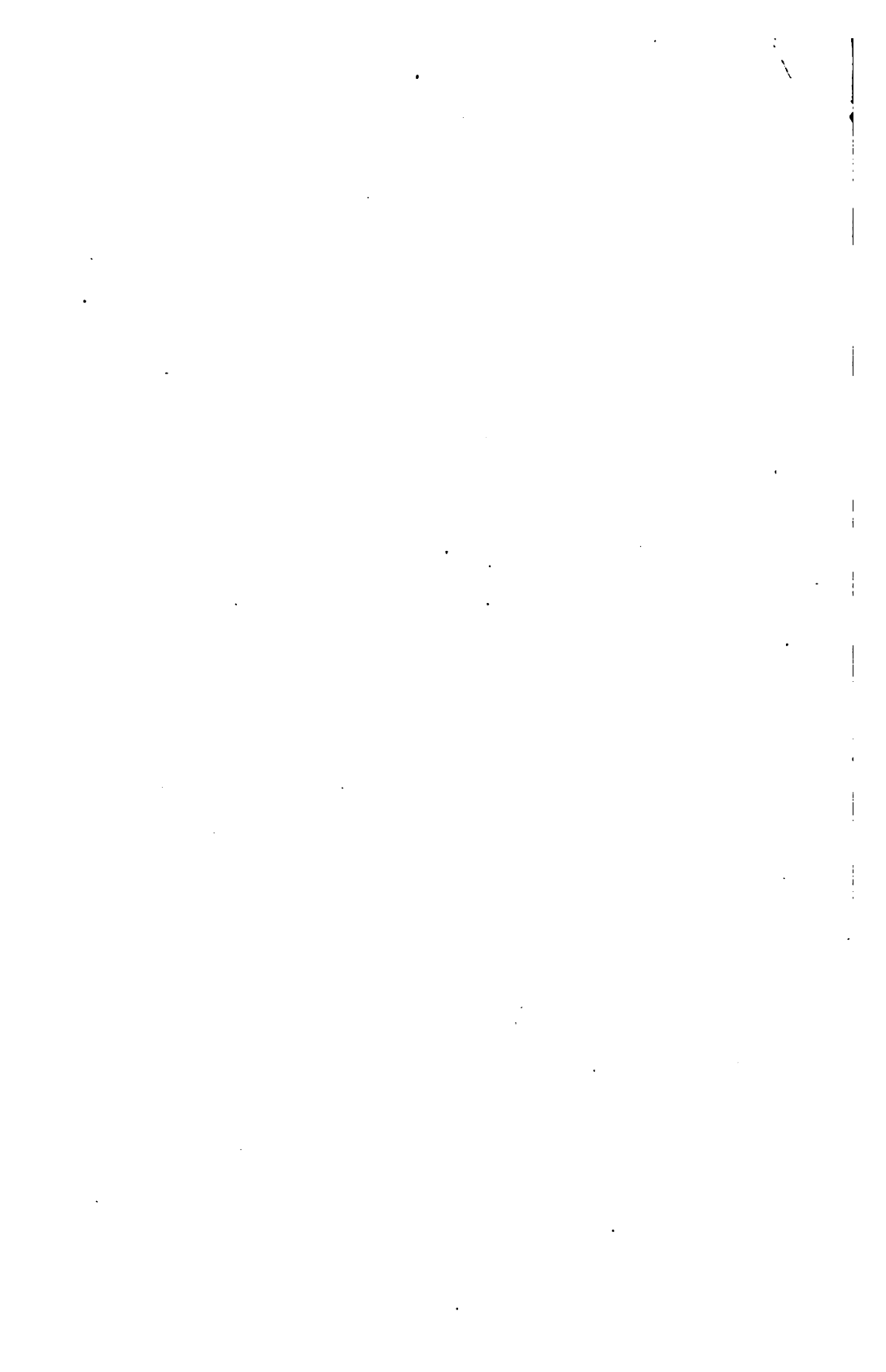
It is a simple, true account, and statement of facts incident to our life and work there—plain facts, penned by a plain man.

F. G. J.



TO

ALFRED C. HARMSWORTH



P R E F A C E

THE remarkable revival of Arctic exploration which took place in 1818 has continued, with more or less activity, to the present time, and yet the Arctic regions seem to be now even more attractive than ever.

Mr. Frederick G. Jackson, the narrator of this the latest of Arctic voyages, sailed from the Thames in July, 1894, in command of an expedition which he successfully conducted for three years.

By the great generosity and public spirit of Mr. Alfred Harmsworth, Mr. Jackson, an enterprising young Englishman, was equipped and sent out to make a thorough scientific exploration of the newly discovered Franz - Josef Land, only some parts of its southern shores being then known, and the hope being reasonably entertained that it might extend far to the northward, and therefore afford facilities for a nearer approach to the North Pole than had hitherto been accomplished.

Assisted by a small but carefully selected staff of scientific observers, Mr. Jackson set about his most arduous undertaking. He determined the geographical limits of this Land, which he found to consist of numerous islands, of no very great extent in any direction; consequently, the idea of gaining a very high latitude was abandoned, and the efforts of the explorers were concentrated upon the thorough scientific examination of the group.

This work was carried on under the most difficult conditions, owing to the rapid currents between the islands, which kept the ice almost constantly in motion, and to the sudden and extreme

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changes of temperature, from intense frost to rapid thaw ; these most trying changes being far in excess of those experienced in other parts of the Arctic regions.

Jackson cannot be too highly praised for his cheerful endurance of three such years, nor for the tenacity with which he adhered to his purpose of carrying on scientific observations, and collecting specimens in every department of natural science, which these islands and the surrounding seas could illustrate. This long series of magnetical, meteorological, and other observations, together with the great and interesting collections of specimens made, amply repay the outlay of the Jackson-Harmsworth Expedition, which will long be remembered by the scientists of all nations for its rich contributions to their store of knowledge.

On September 8, 1894, Jackson established his winter quarters upon Northbrook Island, perhaps the most southern and western of the group. Here he erected his log hut, naming it "Elmwood." His provisions were here stored, and it became the centre of his exploring operations. As already mentioned, the strong currents prevented the formation of permanent ice ; and to the space of water thus left walruses, bears, and seals resorted in abundance, affording a constant supply of fresh meat, which kept the party in admirable health.

The absolute solitude of Jackson and his six companions was only twice broken during the three years of residence at "Elmwood"—once by the *Windward*, which vessel, having been compelled to pass the winter of 1894 at Franz-Josef Land, returned there with supplies on July 26, 1896 ; and previously, on June 27th of the same year, by Dr. Nansen and his companion, Lieutenant F. H. Johansen, who arrived at "Elmwood" in their kayaks.

These intrepid explorers had left their winter hut on May 19th on an islet in latitude $81^{\circ} 4' N.$, and had paddled down to the southwest through the British Channel, between the several islands and the floating ice, for about one hundred miles, in the hope of reaching Spitzbergen and the small vessels which visit it every summer from Norway. Each night they had hauled their kayaks up on the ice, on which they rested, and awaited a favorable opportunity to proceed. But they were now about

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to enter upon far more exposed navigation, for two hundred miles of ocean, more or less encumbered by ice, intervened between them and Spitzbergen. Their frail, canvas-covered kayaks were only 12 ft. long, about $2\frac{1}{4}$ ft. wide, and about $1\frac{1}{4}$ ft. deep; they were covered over, with the exception of a round hole in which the occupant was seated, working his double-bladed paddle. Unlike a boat, these kayaks did not admit of any change of position for rest, etc.

This brief description may afford some idea of the desperate outlook before Nansen and Johansen, and from which they were relieved by their accidental—one might indeed say Providential—meeting with Jackson and his party.

It can hardly be imagined with what a hearty good-will our English party received the wayfarers, and extended to them the utmost hospitality in their power. In Dr. Nansen's description of their meeting on the ice he says of Jackson: "He seized my hand and shook it again, while his whole face became one smile of welcome."

The *Windward*, having landed her supplies, embarked Nansen and Johansen, and sailed on August 7th, and landed them at Vardo on August 13, 1896.

In the summer of 1897 the *Windward* once more visited Franz-Josef Land, and this time brought home Jackson and his party.

But few explorers have ever had the opportunity of passing three consecutive years in the Arctic regions, remote from human beings. I cannot recall any instance of this having ever been done, when escape from it was *possible*. Yet this feat Jackson and his companions cheerfully accomplished, though they had a yearly opportunity of returning by the *Windward*. Truly it may be said that the spirit of enterprise and hardy adventure is as active among us as it was in the days of Queen Elizabeth.

I feel confident that all who read Mr. Jackson's narrative will heartily indorse this opinion.

F. L. McCLINTOCK.

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A THOUSAND DAYS IN THE ARCTIC

CHAPTER I

INTRODUCTION

It was in August, 1873, that the land afterwards known as Franz-Josef Land was first accidentally discovered by the Austro-Hungarian Expedition under the leadership of Weyprecht and Payer. In endeavoring to pass round the northern end of Novaya Zemlia to discover the Northeast Passage, their ship, the *Tegethoff*, became beset in the ice, and after drifting for twelve months an entirely new land came in sight, and the floe upon which the ship had been crushed up was frozen to the land-ice of Wilczek Island. The following spring Payer made three plucky and adventurous journeys up and in the neighborhood of what he then named Austria Sound. After a very hard and perilous journey they were able to beat a retreat to Novaya Zemlia in their boats, leaving the ship to its fate on the shores of Franz-Josef Land, being quite of the opinion that the country was unapproachable by legitimate methods. Payer had reached the latitude of $82^{\circ} 5'$ north, and was under the impression that he had seen land still farther to the north, in and beyond the 83^{d} degree, and land to the northwest reaching almost as far.

It was upon these observations that Arctic authorities advocated this route as the best for exploring to the northward, and upon which I formulated my plans in the latter end of 1892. Unfortunately our expectations in this respect were fated to disappointment by the non-extension of the land to the north, and we had not been long in Franz-Josef Land before we discovered that instead of this country being of continental dimensions, as many

A THOUSAND DAYS IN THE ARCTIC

supposed it to be, it is only an archipelago of comparatively small islands; and this unfortunately quite upset the basis upon which my plans for pushing north were founded, which were to follow the land and form depots of provisions as far as it reached.

Mr. B. Leigh Smith, the well-known Arctic navigator, in 1880 and 1881, visited Franz-Josef Land, and continued Payer's discoveries westward, doing exceedingly good work; and I am glad to be able to testify to the accuracy of his map and observations, which are remarkably correct. On his second visit he lost his ship, the *Eira*, and spent the winter there under very trying and rough circumstances, making a plucky retreat to Novaya Zemlia in the following summer. He and Dr. William Neale are very much to be congratulated upon their good management and tact in keeping the men in good discipline and well, under very difficult conditions indeed. Up to the time of Mr. Smith's voyages Franz-Josef Land was considered unapproachable by ship, and until the journeys of my expedition in the *Windward* had proved to the contrary, its shores were looked upon by most Arctic authorities as unreachable, except during especially favorable and exceptional years.

It was in the latter end of 1892 that I first published my plans, which, I am glad to say, met with the approval of our Arctic authorities. These embraced not only an advance in a northerly direction, but the mapping-in of the coast-lines of Franz-Josef Land, a thorough examination of that country, in taking scientific observations, and making collections generally. These plans we have, I am glad to say, been able to carry out; and scientific observations, which I think I may be excused for describing as valuable, have been carried on uninterruptedly for three years. We have also practically completed the map of Franz-Josef Land, and settled the Gillis Land question.

For some time the sinews of war were conspicuous by their absence, and little encouragement given. Consequently, in 1893, I determined to take a journey to the Yugor Straits with the object of exploring Waigatz Island, and the Bolshaia Zemelskija Tundra, to the south of it, and at the same time thoroughly test the equipment which I intended to use on my expedition to Franz-Josef Land. This I accomplished, extending my journey round the White Sea and through Lapland, to enable me to

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INTRODUCTION

see something of the methods of the Lapps in addition to those of the Samoyads, with whom I had been travelling. It was on this journey that I became acquainted with the use of reindeer as draught animals, and also fell in with the hardy Russian ponies which did us such sovereign service in the Franz-Josef Land expedition ; and I should consider the trouble of that former journey amply repaid if meeting with these horses had been its only result. Ponies can be used to very great advantage in Arctic exploration, and I am more than satisfied with the results of my experiments with them. At Archangel I received a telegram to return immediately, as Mr. Alfred Harmsworth was generously offering to provide the necessary and long-sought funds for my proposed expedition. I considered, however, that I was serving the interests of the expedition best by returning by the rather longer route, *via* the White Sea and through Lapland. The next five months were spent in hurried preparations.

After my return to London the *Windward* was bought, and alterations effected in her ; a log-hut was made and erected, on trial, at Archangel, and furs purchased there for us. For this service I am indebted to the energy and kindness of Mr. Henry Cooke, H. M.'s vice-consul there. Sledges, ski, etc., and more furs, were obtained for us in Norway by Mr. Alexander Nansen, the brother of the explorer, and Mr. Joseph Jeffreson. Tinned foods of all kinds were examined by me, and selected with the help of Mr. Harkness, of Somerset House ; but I relied largely upon obtaining fresh meat in Franz-Josef Land by shooting bears and walrus, as I consider fresh meat to be one of the greatest factors in procuring health. This expectation, I am glad to say, has been entirely fulfilled. With the help and advice of our medical man, Dr. Koettlitz, I am glad to be able to say that in three years not one of us had an hour's illness, and I never knew a single man knock off work on account of indisposition during that time. Through the help and advice of Dr. Koettlitz all tinned meats that were used were carefully examined before being placed on the table, either by him or myself ; anything in the least degree tainted was rejected, and placed on the roof to be out of the reach of the dogs. All water used in food was carefully boiled, exercise was regularly taken, and every one was always busy.

My party consisted of eight men, none of whom had previous Arctic experience :

A THOUSAND DAYS IN THE ARCTIC

1. Albert B. Armitage, who had charge of the astronomical, meteorological, and magnetic observations.
2. Reginald Koettlitz, M.R.C.S., L.R.C.P., etc., our doctor and geologist.
3. Harry Fisher, our botanist and zoologist.
4. J. F. Child, mineralogist.
5. H. A. H. Dunsford.
6. J. W. Heyward.
7. K. Blomkvist.
8. S. Burgess.

WEIGHTS AND MEASUREMENTS ON JULY 16, 1894

	HEIGHT	WEIGHT
Frederick G. Jackson	6 ft. $\frac{1}{2}$ in.	13 st. 4 lbs.
Albert B. Armitage	5 " 10 "	12 " 10 "
Reginald Koettlitz	6 " $1\frac{3}{4}$ "	12 " 4 "
Harry Fisher	5 " 11 "	11 " 7 "
Josiah F. Child	5 " 9 "	12 " $1\frac{1}{2}$ "
John W. Heyward	5 " $7\frac{1}{2}$ "	10 " 3 "

CHAPTER II

OUR START

July 12, 1894, Thursday.—Arrived on board the *Windward* about noon and set off down the river almost immediately. The boys of the *Worcester* manned the yards and cheered us, as did also those of the *Arethusa*, whose band also played us a parting air. Amid the good wishes and the cheers of our friends we let go from the buoy and slowly steamed down the river. Child was missing when we sailed, but we called at Gravesend, as we found that the signal code had not come on board—Armitage going on shore to buy one. Here Child put in an appearance, having missed the 10.25 A.M. train at Cannon Street and arrived at Greenhithe after we had gone. He had come on by train to Gravesend, and just succeeded in catching us up.

We got clear of the river about 4 P.M., having a fresh S.W. breeze to help us on our way north. We have on board as passengers to Archangel, Mr. Herbert Ward, Professor Boulger, and Mr. Arthur Montefiore.

Mrs. Harmsworth has made my cabin and the saloon very pretty with the pictures she has so kindly put on the walls for me, which give them a very home-like appearance.

July 13th, Friday.—A fresh breeze from S.W. Clear, fine weather. A large proportion of the party sea-sick. I fortunately feel quite fit and well at present. The pilot-boat left us off Lowestoft, thus breaking the last link that connects us with home, and as we watch her slowly disappear on the horizon we wonder which of us or whether any of us will see her again, and how many years hence.

July 14th, Saturday.—Fine, clear sky. No wind. Herbert Ward is very busy all day sketching different members of the party and objects of interest on board.

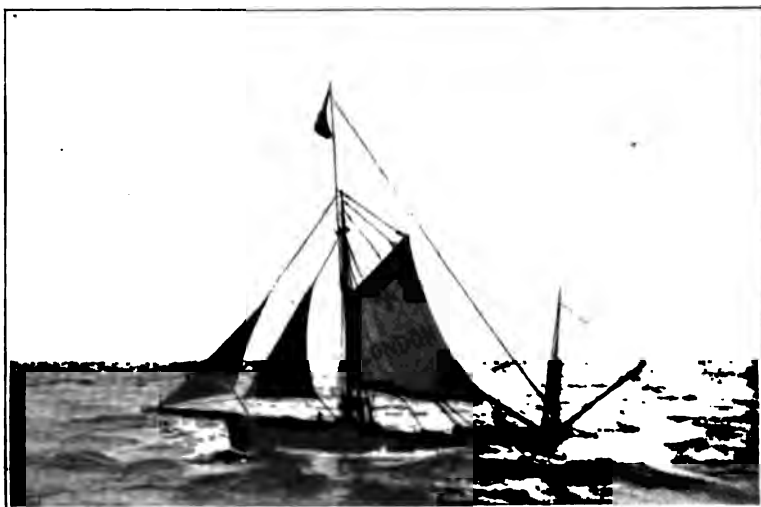
I find now from the captain that it was Mrs. Harmsworth who

A THOUSAND DAYS IN THE ARCTIC

was so kind as to put the pretty, useful articles in my cabin for me. He had been very mysterious about it before when I had questioned him, and said I should hear by-and-by.

July 15th, Sunday.—Clear, cloudless sky. No wind. Service was conducted on the quarter-deck at 11 A.M.

July 16th, Monday.—Clear, sunny weather. No wind. Ran into a swell towards afternoon, causing more trouble among the



"BREAKING THE LAST LINK THAT CONNECTS US WITH HOME"

sea-sick brigade. They are very plucky, however, and some determinedly stick to their pipes through the most awful upheavals of nature.

July 17th, Tuesday.—Head wind from N.E. The captain advises going inside the fjords, as the very small power of the *Windward* will not make headway against a head sea, which will be avoided by going inside. The course will be as short inside as outside, the only question is that of pilotage fees (about £10 all the way to the North Cape, I am told). Settled to go inside the fjords.

July 19th, Thursday.—Light N.E. wind. Considerable N. swell. Sighted land at 10 A.M. at Nogvid fjord, took pilot on board at

OUR START

8.30. Ship did four knots an hour as soon as we got into smooth water inside the islands. The pilot would only take us as far as Christiansund, which he undertook to do for forty kröner. At Christiansund he tells us we can obtain a pilot to go to the North Cape.

July 20th, Friday.—Northerly breeze (light). Passed up the fjords towards Christiansund, opposite which we arrived at 2.30 P.M. I allowed no one to go ashore except the captain, who did so to engage a pilot. While waiting, the harbor master and Lloyds' agent came on board. We heard that news has been received that Wellman's party had met with the pack in 80° N. and had made use of Pyke's house on Danes Island as a depot. Wired to Mr. Cooke, H.M. vice-consul in Archangel, to get twelve tons of hay compressed for us.

Left Christiansund at 3.45 P.M. as soon as the pilot came on board. (Pilots charge 300 k. to the North Cape.)

July 22d, Sunday.—Faint breeze from N.N.W. Overcast sky most of to-day. Prayers read at 11 A.M. on the quarter-deck. Continued our course north through the fjords.

Crossed the Arctic Circle at a small village called Silsuvig about 8 P.M. Ran up the blue ensign and we all drank to it. Ward and I took photographs of the exact spot where the circle cuts, which is marked by a beacon.

Continued writing my book, which I have named *Samoyad and Tundra*.*

Many of the high rocky hills in the fjords show very distinct signs of glacier action.

July 24th, Tuesday.—Fine, clear, sunny day. Faint N. breeze. Passed one or two small steamers, and the mail steamer *Kong Harold*, in which I had come from Vadso to Tromso last January. She saluted and gave us quite an ovation—I know all the officers on board. Pursued our course north through the fjords. Opened the main hatch and got out various portions of our outfit which will be required before we reach Franz-Josef Land. Passed Tromso at 11.30 P.M. Stopped for three minutes and sent letters on shore by a boat which came alongside. Sent two "wires" to Harmsworth.

* Since entitled *The Great Frozen Land* by my publishers after my departure from civilization.

A THOUSAND DAYS IN THE ARCTIC

July 25th, Wednesday.—Passed several small glaciers flowing down the hills towards the fjords. Fine and cloudy at intervals. Stiff north breeze towards night.

Passed Hammerfest about 9 P.M.

July 26th, Thursday.—Fine, clear weather. Northerly breeze. Put the pilot down at Haenningvaag, on Mageoere Island, on which the North Cape is situated. When about fifteen miles west of the Nord Kyn the valve of the safety-valve stuck (at 4.30 P.M.) and blew out all the steam. Set all sail and went on the starboard tack while repairing the valve. Got under steam again at 7.30 P.M. Saw a few "finner" whalers. Rounded the Nord Kyn.

July 31st, Tuesday.—Picked up pilot off the light-ship and proceeded up the Dwina to Archangel. Were cheered by shipping. At 7 P.M. arrived off Solombola.

Solombola is composed chiefly of ballast, we are told, from British ships prior to 1854, giving an idea of the trade between this country and Northern Russia at that time.

Let go anchor. Proceeded on shore in Schmidt's launch. Sent off wires to Harmsworth and my mother. Met Rev. C. Pascoe and Mr. Wilton, and Vice-Consul Cooke joined us later. Drove up to the consulate and received letters and papers from home, and had a zakoushka there. Took four drouskis which raced all the way back to the ship, reaching it about 2 A.M. Rise and fall of tide about 2 ft. 5 in. at Archangel.

August 1st, Wednesday.—Fine, clear weather, with fresh gale from north. At 8.30 A.M. received an official visit from H.I.M. cruiser *Vestnik*—the first officer coming on board to call—which I returned at 11 A.M. Went to Schmidt's office and Landtmann's store on business with Cooke, and in the afternoon made sundry purchases.

The governor had intimated that he would receive the members of the expedition at 5 P.M., at which hour we and also the visitors called upon him, and he invited us to a party at his house on the following evening, to meet the officers of the *Vestnik*. We all dined together in the evening at the German Club, and afterwards went to a village fête on an island in the Dwina, going by steamer there. We are told that we British take our pleasures sadly, but of all the melancholy entertainments I ever witnessed, this certainly was the most so. Even the peasant with much

OUR START

vodka on board did not rise to the occasion and get hilarious, but merely exhibited his condition by his uncertain gait and undue affection for his fellow man.

August 2d, Thursday.—Writing letters all morning. Transacted business in Archangel in the afternoon. Dined at the governor's with the members of the expedition. We were toasted most enthusiastically by our Russian friends, an especial honor being done us by drinking our healths in the Russian punch "jounka" with lights out, a song being sung in our honor. Left about 2.30 A.M., and returned to the *Windward*.

On arriving at the governor's we first had a "chi peet" (tea); then cards; then zakoushka; then supper. I made inquiries about Samoyad marriage customs of the old heathen times. The governor tells me the matter was arranged between the families of the man and woman—the man practically buying the girl.

August 3d, Friday.—The Czaritza's birthday and general holiday. Armitage at 7 A.M., at my request, dressed the ship with bunting, with the Russian flag at the main. Dr. Koettlitz and I went by invitation on board the *Vestnik* to lunch. An imperial salute of thirty-one guns was fired at noon. They have two bear cubs on board—one Polar and one brown bear. I noticed a great difference in the behavior of the two, the brown cub being far more civilized and gentle-mannered than its white brother, which was very disagreeable and bad-tempered. We dined at the German Club, and went to the only theatre, where a drama of three hundred years ago was played, lasting from 8 P.M. to 1.30 A.M. on the following morning. We then returned on board the *Windward* and sent out invitations to a lunch which I am giving to-morrow as some small recognition for the great hospitality we have met with on all hands.

August 4th, Saturday.—Finished my letters. Gave a lunch on behalf of the Jackson-Harmsworth Polar Expedition at the German Club, which was attended by the Governor and officials, the captain and officers of the *Vestnik*, and a large number of other friends, and went off most satisfactorily. A number of toasts were enthusiastically proposed and drunk. I proposed that of Governor Englehardt, which was drunk with musical honors, and most enthusiastically.

We lined the entrance to the club when the governor and

A THOUSAND DAYS IN THE ARCTIC

Captain Larin of the *Vestnik* left, and loudly cheered them. They have been most courteous and kind to us.

I afterwards went with Cooke and Herbert Ward to complete my purchases.

The Archangel Monastery was burned down this evening. Dined at the German Club and then returned to the *Windward*. Bought furs and equipment for all the crew, to provide against the possibility of wintering in the North.

August 5th, Sunday.—The governor, the captain of the *Vestnik*, and the commander of the forces of the Government of Archangel paid us an official visit at 10.30 A.M.

The governor kindly presented me with three of his photographs—one as governor, one as Court Chamberlain (Kammörherr), and one in private dress.

Finished my book. The draught of the *Windward* on leaving was 17 feet 6 inches abaft, 14 feet forward.

At 7 P.M. proceeded down the river, being towed by Schmidt's tug, but had to cast anchor just inside the "bar," as we missed the tide. Took on board a Russian carpenter to help us to put up the log-house and to act as interpreter at Kharborova with Råwing, who has our thirty dogs there. We are fearfully overloaded and the ship looks dangerous.

Mr. A. Montefiore, Professor Boulger, and Mr. Ward accompanied us down the river, and remained on board through the night. Mr. Pascoe read a short service on board at 1 P.M.

Mr. Cooke and every one at Archangel have been *excessively* good. Executed power of attorney and wrote my signature to one for Mr. Harmsworth in connection with my cooking-stove,* leaving both to be filled in, as time is so short and there is no time to complete either.

August 6th, Monday.—Our guests went off by the *Obb*, which passed us at 5 A.M. We gave them cheer after cheer as they left us, and which they returned—the last of our English friends!

And so on the 6th August, 1894, we steamed away from civilization, turning our steps towards that great white North that has claimed so many lives and baffled so many daring enterprises. We sailed away into the unknown, that unknown so

* This was a spirit stove designed by myself, as I could not find any such stove at all satisfactory in the market.



SAMOYADS AND CHOOM

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OUR START

enveloped in mystery. The desire to lift aside the veil of Arctic uncertainty is strongly upon us; my party, nothing daunted by hardships certain to be encountered, are pushing rapidly north, hoping to add to the world's knowledge and the dominions of our Queen—icy and uninhabitable though they may be. Cynics may scoff at discovering tracts of ice-covered wastes. "Of what good are they?" they ask. But my reply is, that Arctic or Antarctic exploration is of every good, if it be only to contend in what has become an international competition. No country is so ready to applaud and reward explorers of other nations, or to show so much generosity, as our own, and it will be an evil day for Britain when she ceases to take part in what has become a competition, and is content to yield our place in the race of Arctic discovery, which we so long have held, and to see strange flags where the "jack" should wave.

August 7th, Tuesday.—I drew out rules for guidance in case of fire and had three notices posted—in fore-castle, officers' mess, and saloon companion. I am rather fearful of it owing to the quantity of hay on deck, which is not *compressed* as we in England know it.

"How to act in case of Fire."

Copy.

"1. At once rapidly strike the bell from side to side.

"2. The carpenter to attend to hose.

"3. At once use the buckets of water always in readiness on the bridge.

"4. At night the officer on watch is at once to sound the steam-whistle by tying it open and then call the captain.

"N.B.—No smoking is allowed on deck excepting forward of the windlass or in the lee-boat abaft the funnel.

"FREDERICK G. JACKSON."

August 10th, Friday.—Entered loose ice at 1 A.M., through which we sailed all day. East winds, overcast, occasional fog. Shot a seal on passing an "ice-piece" in the morning. Cleared the ice about 10 P.M.

August 11th, Saturday.—Moderate northwest winds. Overcast, rainy weather. At 4 A.M. entered more loose ice, passing out about 4.30 A.M.

At 9.30 A.M. we sighted Dolgoi Island, altering our course after

A THOUSAND DAYS IN THE ARCTIC

sounding (15 fathoms 5 miles west, sand) to pass round the north point. We could see a large cross on N.W. point (hill) of the land. Passed to the north about four miles off. Experienced a southerly current. Sighted Waigatz Island at 4.30 P.M.

Reached the entrance to the Jugorski Schar about 6 P.M., a cairn with a staff on it on the Waigatz shore is a good guide in entering. Passed up at half-speed, sounding frequently. Arrived off the village of Kharborova about 8 P.M., a Samoyad settlement. All the land party and I went ashore. Here I found Rāwing, a German, who has been sent by Mr. Wardroper with thirty Ostiak and Samoyad dogs, awaiting our arrival, having reached here two days prior to the time named in his contract. He started on his journey with thirty-three dogs, but two died of a disease somewhat like rabies and one ran away.

The great majority are Ostiak dogs of varying appearance; some stout, heavily boned animals weighing from between fifty and seventy pounds, others leggy and wolf-like in appearance. The coloring is varied from gray to a very dark brown. They all have very thick coats, pricked ears, and are more or less wolfish in disposition, especially in their dealings with each other. The Samoyad dogs, on the other hand, should be entirely white with the exception of the nose, the tail bushy and turned over the back, and the ears pricked. Their weight varies from forty-five to sixty pounds. They much resemble large Pomeranians in appearance.

The great trouble I had with them was their propensity for killing each other. One dog would get into disfavor with the rest of the pack, and become ostracized from canine society. One of them would then pick a quarrel with him, in which he would generally get worsted, as fair play with these dogs, as with some men, is an unknown quantity, and he would then be set upon by the whole pack, and be torn to pieces.

It is very remarkable how a dog would become "marked," which fact he would fully realize, and on his appearance his companions would prick their ears and by their demeanor say, "Here is the hound; come, let us kill him!" I lost more dogs through this unpleasant propensity than from any other cause, which the most rigid precautions in muzzling, chaining up, and the utmost care generally failed to check entirely. In fact, their caninical proclivities were a never-failing source of anxiety to me, and I



A TEAM OF REINDEER

ASTORIA, OREGON AND
THE COLUMBIAN RIVER
DISTRICT
JANUARY 1904

OUR START

I felt a feeling of relief on learning in the morning that no one had broken loose in the night and become the cause of a consequent deaths. They were, however, perfectly well acquainted with human beings, although somewhat nervous and singularly intractable, coming when called exactly when wanted, ought proper, or refusing entirely to notice any order addressed to them.

I went to try and get thirty poods of reindeer meat, but find it is considerable difficulty, as it is a little too early for reindeer meat here. However, a Samoyad undertakes to supply thirty poods of young meat at two roubles per pood (36 lbs.) ; this is dear. Råwing tells me a long tale through an interpreter of the trouble he has had and the expense he has been put to in reaching here.

We, followed by the few Russian peasant traders, went for a walk in the direction of the Nikolski river. I drove five reindeer in a sledge for some distance, taking one of my men with me on it.

Returned on board about midnight. A clear, fine evening. I am not sending letters from here, as it is a hundred to one against them reaching Archangel, as the Samoyads are indifferent postmen, and in all probability any letters sent would never reach their destinations. It is needless to say that there is nothing approaching a post across the Great Tundra to the south, between here and the Petchora river.

August 12th, Sunday.—The doctor read prayers in the cabin at 10 A.M. at my request, and I had the crew called aft. We all then went ashore—to botanize, geologize, photograph, etc., and to try the dogs in a reindeer sledge. To those that pictured dog-driving as described in some boys' books—an Esquimau seated on a sledge with a long whip in his hand, being carried along without effort at the rate of ten or twelve miles an hour by six or eight willing animals—this their first experience of dog-driving proved an unpleasant surprise. The picture was changed to an unwilling, howling, and snapping pack, their traces always mixed up into inextricable knots, and the heated driver with ruffled temper running alongside, vainly endeavoring to separate his belligerent team and induce them to attend to business.

I am told that the meat ordered cannot be got, as the Samoyad has cleared out to Waigatz Island. Other meat, however, is promised later on in the day, and will be ready to go on board.

A THOUSAND DAYS IN THE ARCTIC

early to-morrow, they say. I am particularly anxious to make a good start with fresh provisions. Very foggy all day. Spent the day bargaining with the Samoyads, and learning further particulars as to their manners and customs.

I hear that although the Waigatz and Bolshaia Zemelskija Tundra Samoyads call their only god "Chadee," the Siberian



A GROUP OF SAMOYADS AT DINNER

Samoyads name him "Shitan." There is only one god, who is both good and bad. Their high priests are called "Taad-dee-ve," who also are doctors, although they use no medicines, but ask "Chadee" to cure the patient or enable them to do so.

When sacrifices are performed to "Chadee," the Samoyads take a reindeer (which has never been allowed to do any work, but has been kept and fattened for the purpose for years), and

OUR START

go to their holy spot called "Yon-pa-ha-py," put up a choom, and having closed it, light a fire, making it very full of smoke. The "Taad-dee-ve" then proceeds to yell, stands on one leg, and beats a drum, in which he is joined by the other Samoyads when he is exhausted. This goes on nearly all night, until the "Taad-



AN ANCIENT HEATHEN SAMOYAD BURIAL TOMB

dee-ve" falls into a so-called trance, in which he is supposed to have converse with "Chadee" or "Shitan," and learn his pleasure, after which he gives advice. During the ceremony the reindeer, which has been tied up outside to a stake, is killed by degrees in a most cruel manner, each Samoyad inflicting a slight wound upon it until it dies. They then cut out the windpipe, which is considered a titbit, and this is offered to "Chadee," the

A THOUSAND DAYS IN THE ARCTIC

rest being eaten by the Samoyads themselves. Human sacrifice is never now offered, and it is doubtful if it ever was.

The rings of stones to be seen on Waigatz are called "Yalmal Haishie," and are so placed to weigh down their chooms or tents. "Yon-pa-ha-py" is a hill in Waigatz which is a favorite place of worship, and Samoyads come thousands of versts to worship here. There are said to be two deep holes in Waigatz, one on the crest of a hill a little inland from Varonoff Noss, at which the Samoyads worship "Chadee." They will never take strangers to places where they worship. The hole is seven feet in diameter and of unknown depth, as they will not sound it. On the old Samoyad burying-places the dead man's "lodka," "loegia," sledge, etc., were always placed. The sledge is placed there in the same condition as that in which he left it, and if the sledges usually seen are broken, it is merely accidental.

The Russian priests have only been partially successful in converting the Samoyads to Christianity, the inducement often being a red shirt and a pair of trousers, which are given to a Samoyad by the priest after being baptized. In many cases the baptized Samoyads go and wash themselves to purge themselves of the baptism, laughingly remarking that they are now as good as ever they were, and richer by a shirt and trousers.

We had tea with the Russian priest—a man named Popoff—a vast improvement on the one of last year, when I visited Khaborova first.

The tide sets from the Kara Sea very fast west (at four to five knots), and is bringing great quantities of ice through the straits. I secured a Samoyad skull to-day from a very old burial-place, after photographing the tomb.

August 13th, Monday.—A very dense fog on. I went ashore to see about the meat, the captain and the members of the land party accompanying me. The ship was quite obscured by the fog. The meat had not arrived, and I am now told it can't be got. After much bother and showing of the governor's paper, it is promised to-day, and I sent Råwing off with the Samoyads to pick good animals and to see that fair weight is given, and to hurry things up generally.

The steam-whistle on the ship having been blown several times, I started off by myself in a Samoyad "lodka" to see if all was going on right—the fog being too thick to see the ship three-

OUR START

quarters of a mile off. I soon found a very fast tide was running from east to west, carrying large quantities of heavy ice with it, and after a hard row I managed to get on board, finding the ship by the sound of the whistle. I found that Armitage and another man had just got on board, but had lost their boat in doing so. The tide was running at the rate of four or five knots an hour, carrying heavy ice against the anchor chains. The anchor was dragging, and we feared that the ship would go on shore, and altogether things looked very unpleasant. After about three hours of this kind of thing the tide slackened a little and the fog lifted a bit, and I set off in the sixteen-foot Norwegian boat with Armitage to fetch the captain, who was on shore still, and quite ignorant of what was passing. We found him in a great stew about my safety, as he had not liked my embarking in the "lodka" alone.

After we got on board again the anchor was weighed, and in charge of the pilot she proceeded to steam towards the village of Kharborova, having drifted about a mile and a half down the straits. I advised steaming down to the bay at the southwest side of Waigatz, or else to anchor outside the straits behind the island, but our pilot assured me that it would be safer to lie opposite the village near in to shore, as he assured me there is plenty of water there, and as he had been through the straits five or six times before, I assented, as I imagined that he knew best. The lead was kept going all the time, and I left the bridge for a moment to go below, the pilot saying that he should anchor a few dozen yards ahead of where we then were. There were five and a half fathoms of water at this point. About three minutes after going below I heard three fathoms called, and at once rushed on deck, but only to find the *Windward* grounded by a length and a half on a mud-bank. Full speed astern was tried for an hour without moving her an inch. I then went ashore to ascertain the present state of the tide and the time of the next high water. I found that the ship must have gone ashore at high water, and the next full tide would be at 3 A.M. The ship went aground at 3.30 P.M. This is very pleasant!

I turned out the land party, and proceeded to lighten the ship by putting the coal in sacks on the quarter-deck ashore in the boats, working till late in the evening; an anchor was run out astern with a cable, and a strain put on it with the steam-winch.

A THOUSAND DAYS IN THE ARCTIC

We then awaited the tide at 3 A.M., hoping that then we could steam and warp her off. Every one feels and looks rather glum, and with very good cause, as the situation is most serious. There was a turn of the chain round the anchor, which explains its dragging. The fog lifted about 5.30 P.M.

August 14th, Tuesday.—Every one out on deck at 2.30 A.M. Steamed full speed astern and did our best to warp her off, but could not stir her an inch. She is aground in two and three-quarter fathoms of water both fore and aft.

I ascertained that the next full tide is at 3.30 P.M. As it is hopeless to expect to move her this tide, I directed every one to turn in till 7.30 A.M., after which we had breakfast, and I then set to work with the land party to remove more coal to the shore, which was about three-quarters of a mile off. We worked with a will and most heartily, every one doing his level best. After getting most of the coal off on the port side (on which side there was a list at low water of 45° , so that plates and dishes would not remain on the cabin table) we set to work on the starboard side, when she canted over very suddenly to starboard. We worked away on that side until we had got her on nearly a level keel again, and then awaited the rising of the tide, having got nearly forty-five tons of coal on shore, emptied the water-tanks, dropped over the bows the heavy anchor with a long length of chain, and placed one anchor between two boats alongside.

About 2.30 P.M. we tried steaming full speed astern and warping. For some time she would not move, but at last started to do so just a little, and finally, much to our delight, got clear of the bank, amid cheers from the land party.

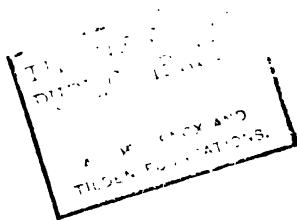
After a hurried lunch, I took all the land-party ashore and proceeded to load up the boats with the coal again—working like niggers, and we were all much the color of them. One and all of our party did their level best and worked with the heartiest goodwill. I feel very pleased with them.

We got all the coal on board again but about three or four tons. The thirty-one poods of reindeer meat was sent on board to-night.

A peasant came on board complaining that one of the crew had stolen his boots when on the ship. I compensated him, but quite failed to understand how it was he preferred to be without them at the time. Lightning was seen to southwest to-night, but no thunder was heard.



A SAMOYAD VILLAGE BEAUTY



OUR START

August 15th, Wednesday.—A fine, clear day. Went ashore with the land party, and loaded up the remainder of the coal. Some of the crew have been detailed off to get water on board. As I was determined to get away to-morrow morning I called out the land party, and we got a full boat-load of water on board between 9 P.M. and midnight.

I ordered Råwing to bring all the dogs on board, fifteen being chained up aft and fifteen forward. I gave him a testimonial, a rifle and three hundred rounds of ammunition, tea, coffee, a sack of biscuit, tinned meat and butter, and fifteen roubles. He was very pleased, and gave me a copy of a book written by Drontheim about his journey to the Jugorski Schar with Nansen's dogs last year.

I gave all the Russian peasants and Samoyads many presents of provisions, etc., and had them to tea on board; to Ivan Berzoomoff, who travelled with me last year, I presented a rifle and three hundred and fifty cartridges. I received many little presents in return, of ducks and fish. I purchased two sledges, a number of Samoyad articles, and two Samoyad bitches, which proved to be the sustainers of my pack in Franz-Josef Land.

I told Berzoomoff that Mr. Popham will call for the boat he gave me, which is quite safe here in his charge. Both Russians and Samoyads have acted very nicely, and appear glad to see me again.

August 16th, Thursday.—After stowing the hay, at 9 A.M., in fine, clear weather, we proceeded down the straits at "easy ahead," sounding all the way, for I insist on this, and got out of the straits about 11 A.M. without further mishap.

I bought four reindeer sledges and sinew for sewing.

West to south-southwest wind. Fine, clear weather till 11 P.M., when a thick fog came on again.

Passed through streams of ice soon after midnight.

I feel thankful to be clear of this spot at last.

August 25th, Saturday.—Steaming north all night with a little water towards the land; Capes Crowther, Grant, and Bell Island sighted about 5.30 this morning. I turned out directly I heard this, and went up into the crow's-nest. Franz-Josef Land at last in view!

Cape Crowther is a bluff, flat-topped cape, with an ice-cap above, and with glaciers on either side. All the southwest coast

A THOUSAND DAYS IN THE ARCTIC

appears high and bold, entirely glaciated land, with at infrequent intervals bare, bluff, projecting black headlands of basalt.

About 11 A.M. we were stopped steaming north about thirty miles south of Bell Island by a hard barrier of very heavy ice between us and the land. We "lay to" in a "polynia" all day, occasionally steaming to avoid ice. Heavy snow at 5 A.M., coming on in storms again occasionally throughout the day. Clear in the early part of the day, but coming on cloudy, misty, and overcast, obscuring the land in the afternoon.

Crowther tells me he has never seen such heavy ice lying against the land at this point before. The east winds have probably brought this heavy ice through between Novaya Zemlia and Franz-Josef Land from Kara Sea.

Difficulties seem to be increasing daily.

August 26th, Sunday.—At twelve midnight, when Crowther came on watch, he and I went up into the crow's-nest to see if we couldn't find a passage through the ice, which since morning had separated out again. Steamed up into the throat of the bight, but could get no further, as a wide barrier of ice miles in extent separates us from water farther in shore.

Crowther insists that it is necessary to retrace our steps for some distance to give the ship room to lie. This, to me, is very much against the grain. "Lay to" again, and waited for the ice to open. Dense fog after 4 A.M. all day. Tied up to a floe, and waited for it to clear. I discussed the advisability of offering bonus-money as an incentive if the ship gets in and away home this year. Settled to do so if things don't improve on the fog lifting. Awfully annoying and tedious this inaction. About 9 P.M. the fog lifted. I at once went to the crow's-nest, Crowther following. Found that we had drifted to the west about thirty-five miles, being now abreast of Cape Neale, the ice towards the land being tightly jammed up. As there appears a chance of getting round the back of it by going east, we let go from the floe and steamed S.E.

August 27th, Monday.—About thirty-two miles south of Cape Grant, the ice looking very close and hard to the north. I decided to offer £85 if the ship gets in to land and away again this autumn. I told the crew that we *must* land, and that I had not the smallest intention of returning to London, but that we should winter it out somewhere. At 10 A.M. Armitage and I again

OUR START

went to the crow's-nest. Decided to steam south and east, as there is no chance of getting to Bell Island or to land at all from where we are.

I suggested to Crowther to do this, and he agreed that it is advisable to try east, and endeavor to get round the back of the ice.

Steamed S., S.E., E., and finally S.W. all day along the edge of the tight ice. Armitage and I were most of the day in the



THE WINDWARD TIED UP TO A FLOE, AUGUST, 1894

crow's-nest helping Crowther and "John" to direct the ship's course, as they complain of being short-handed. I told Crowther that I left the ship entirely in his hands in the ice, but that we must reach Franz-Josef Land, and repeated what I said yesterday morning, as I wish him to have full control over the crew in working the ship in the ice. We must and shall not be turned back at the eleventh hour.

The sun set to-night.

August 28th, Tuesday—At 12.30 A.M. Crowther came down from the mast-head to say he cannot proceed farther east, as there is no lead, and suggests that we had better return to where

A THOUSAND DAYS IN THE ARCTIC

we started from this morning and wait for a northwest gale to break up the fast ice to the north or a swell from the southwest.

Steamed northwest till 9.30 A.M., and then anchored to a floe in latitude $79^{\circ} 22'$ north, longitude $46^{\circ} 8'$ east. Weather clear, but no sun. Crowther tells me that he thinks the ice has not broken up along the coast this year. Shifted our position twice during the day, owing to the floe breaking up and ice closing in. Tide set from east to west at least, three knots per hour about midnight.

A bear, our first visitor, came down towards the ship about midnight, but would not come close. Armitage and I took the small Norwegian boat and went after him on the floe, but he cleared out before we got near enough for a shot.

Put a bottle overboard with information as to our position and movements, with a request that it be forwarded to Mr. Alfred Harmsworth if picked up.*

August 29th, Wednesday.—Lay anchored to the floe, occasionally moving from one piece of ice to another as necessity required. Calm, westerly airs, overcast sky. Ice showing signs of breaking up. Want a good northerly wind to carry it away south.

Armitage and I took the small Norwegian boat out to try a shot at seals. When out in it we saw a bear at the edge of the floe, which, on seeing us, proceeded to stalk us; on our pulling through some bay ice he crouched like a cat at the floe edge and then waited for us to approach. We fired a bullet into his neck on getting within thirty yards of him, which appeared to astonish him somewhat, as he evidently fancied he was going to do the hunting himself. He then took to his heels, two more shots being planted in him as he went, but without stopping him. Although very severely wounded he managed to run over the floe, across which we followed him with one cartridge left, tracking him by his blood-stains as occasionally we lost sight of him owing to hummocks. We pursued him for about three miles, when he crossed some water on to another floe, and we had to give up the chase.

When returning to the ship we had to drag our boat over the floes for some way, owing to the ice, which was in rapid motion, having come down around us. We had some trouble to get on board.

* Up to going to press, February, 1899, it had not been heard of.

OUR START

About midnight Crowther came down to tell me that there was a bear on a small floe a short distance off. Armitage and I went off again, and I succeeded in shooting him. This bear also fancied he was going to hunt us until he received a bullet, as he proceeded to stalk us, and appeared much disgusted on the tables being turned.

Young ice is forming rapidly on the sea to-day. The temperature is much colder, and the weather very wintery. We must reach the land soon, or we shall spend the winter in the driving pack, and shall stand a good chance of sharing the same fate as that of the *Tegethoff* and the *Jeanette*. Things don't look a bit nice.

August 30th, Thursday.—Owing to a southerly breeze the ice is moving north towards the land again, and we had to steer southwest to avoid being beset. Calm, overcast, cloudy weather, wind southwest (light), with occasional snow-storms, slackening down to a calm towards the afternoon.

About 3 p.m. two bears (she bear and cub) were seen ahead of us on a floe. They moved across the ice, and took to the water. We steamed down upon them, and shot them from the bows. The meat will be very useful.

About 10.30 Crowther came down from the crow's-nest, and told me that the ice north is slackening off rapidly, and hopes that in twenty-four hours may have opened out sufficiently to enable us to get into the land water. We are directly south of Cape Crowther. There is evidently a strong westerly set of the current along the coast here. The tide sets from east to west. It will be an immense relief to get to land.

Started on bear's meat for breakfast to-day.

September 1st, Saturday.—At 1 a.m. Crowther stopped the engines, and sent word to say that the ship is surrounded by ice and can't go farther east. I went up to the crow's-nest, and after a look round decided that we must go south or southwest if necessary to get round the ice.

Under steam all day, skirting the floes and taking any lanes of water or open spaces that offer themselves, leading in a northerly direction; sometimes all round the compass.

The captain reports to me that there is twenty days' steaming coal left (including all the coal on board and leaving nothing for Franz-Josef Land), with eight tons in the hold, twenty-five tons

A THOUSAND DAYS IN THE ARCTIC

in the bunkers, one ton on deck. The ship is burning five tons per day. I have had her slowed to three-quarter speed to reduce consumption, as I feel sure we shall burn far less coal in proportion to the reduction of speed.

Dead calm most of the day, but occasionally slight easterly airs. Passed through much young ice during the evening, and frequently we can hardly make headway through it.

September 2d, Sunday.—Dr. Koettlitz read prayers at noon. Overcast, cloudy, and foggy in the early morning. Passed through much young ice.

At noon by the courses we find we are eleven miles southwest of our position yesterday. The ice-men are not at all happy in the present position, and say we shall neither get in nor out, and want to tie up to a floe and try to drift out. I ask them if they mean to throw it up already. Under the circumstances I think it better that we should return to our position of the 31st, and trust to a northerly wind to carry the ice off the land, enabling us to get in, this apparently offering the only chance of reaching the land. The crew don't at all like the look of things, and say we are certain for a winter in the ice now.

We have recently pursued a most erratic course, and at this pace we shall remain here for weeks. I believe we have now got into the Spitzbergen ice.

About noon a moderate breeze from the north got up, which raised my hopes of it bringing the ice off the land. Stood to north and east at 1 P.M.; made clear water at 5.30 P.M., standing to east-northeast. At midnight high land on port bow was seen which later proved to be Cape Neale.

September 3d, Monday.—At 2 P.M. kept to northeast. Stopped at 4.30 A.M. with Cape Grant forty miles distant to the north. The ice still packed towards the land. It looks impossible to get in from this point, and the only chance is to try farther east, through a lead from the large water up which we have passed, and which we noticed leading eastward, with indications of further water that way. I decided to try in that direction.

At 10.30 A.M., half an hour after starting, one of the ship's company suggested that it will be better to try and get away south, as it is risky staying longer here. It seems almost impossible to get in to the land under these conditions. I go to the crow's-nest myself constantly, and do my best to keep the ship eastward,

OUR START

but somehow as soon as I am away off she goes again south or southwest. I gave the captain orders to go east, in the hope that the ship may go southeast instead of farther westward, and told him to anchor to a floe in preference to going the latter course. It seems a hopeless game.

Since 2 P.M. we have had all the hay off the main-hatch and some of the Franz-Josef Land stores out of the hold, to get at the coal that had been reserved for the homeward journey. We are filling up the bunkers with it, as there are only three days' coal left there.

The ship is now burning only three tons per day, as she has been reduced to half and three-quarter speed with twenty pounds pressure (the chief engineer has orders to run the engines at not more than from fifteen to twenty pounds pressure).

Nearly a dead calm after 11 A.M. Cloudy sky; no sun. Getting rapidly dark at night now. Strong current to southwest.

September 4th, Tuesday.—We have now been nearly a fortnight in sight of land, and yet cannot get there.

Navigating the ice and endeavoring to steer to the eastward. At 3.30 P.M. stood to northeast. Light northeast winds and overcast. Occasional snow-storms.

Officer on watch, on discovering our intention to try to the northeast, was much concerned, saying that we cannot get into the land and shall certainly be locked in the ice for the winter. I told him that we must try that way nevertheless, and have no intention of giving up till every chance is gone.

I have told the crew that "we shall not return until every possible chance of landing is gone, and remarked that the eyes of the whole world are upon us; that this is not a mere whaling cruise or a pleasure party, but that we must do our utmost to fulfil what is expected of us, and that I know they will act like men."

I keep an eye on the ship's course constantly, and let them know it.

September 6th, Thursday.—About 1 A.M. commenced steaming through a narrow lead blocked with bay ice (two to three inches thick) towards a polynia in the floes in the direction of Bell Island. Forged ahead very slowly, having frequently to butt the ice ahead two or three times before we could squeeze through. By 5 A.M. we had advanced about five miles nearer our

A THOUSAND DAYS IN THE ARCTIC

destination, when we were compelled to "lay to" again to await a further opening.

At 9 A.M. the man on watch came to tell me that the wind is increasing from the west, and that the ice looks like shutting up: what is he to do? As we can only remain where we are I told him so. I think we shall be fairly safe.

I have had 580 lbs. of tinned meats brought up on deck for each boat and the biscuit got handy in case of anything going wrong, so as to be ready to place them on the floe.

Lay all day in a polynia with a freshening westerly wind, increasing to a strong gale, from southwest, with overcast sky and snow. The gale shows signs of opening out the ice, and several leads towards Bell Island are beginning to appear. About 9 P.M. "John" came down to say that the leads are widening and he thinks we can push on. I went to the mast-head to have a look round. It was blowing a strong gale, with snow. I had the other iceman called, and he gave it as his opinion that it would be better to wait for the gale to moderate before proceeding and to allow a lead immediately ahead to open a little.

A lot of water is visible on the sky between Eira Harbor and Cape Flora. Sights could be obtained to-day.

I told the captain and the icemen to push the ship in as long as there is a drop of water to float her.

September 7th, Friday.—At 12.30 A.M. the officer on watch came down to say that a floe to windward is coming down upon us, and that we must shift out of the way of it. The wind is increasing with fitful gusts and it is snowing heavily. Got under way, and very slowly and laboriously pushed through the bay-ice surrounding us, and by repeated ramming and warping managed to force our way between the floe and some drift ice, and then tied up to the floe where we are protected. I waited for the snow to clear and the wind to moderate before pushing forward again. At 4 A.M. it showed signs of doing so.

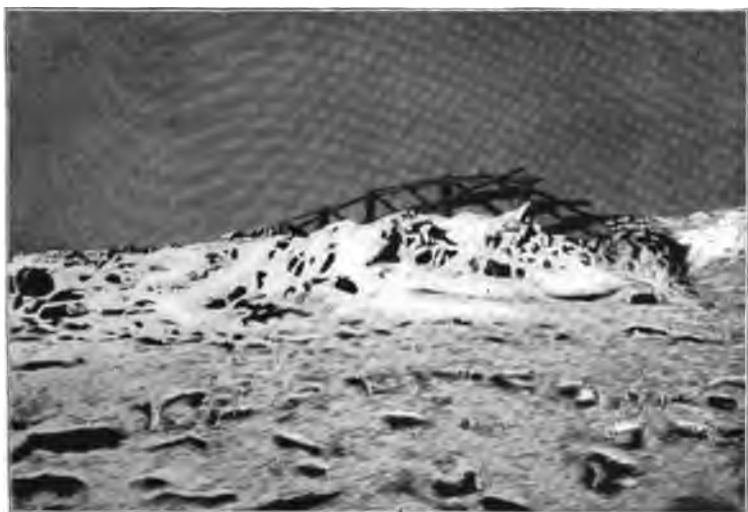
At 7 A.M. the weather is clearing. The wind has shifted to west. At 8.45 A.M. we forced our way, after much ramming and warping, through the ice into open water and proceeded towards Bell Island. Thank goodness we are through at last! We have succeeded in spite of all our difficulties in reaching Franz-Josef Land. We have overcome all obstacles, but it has been a tough fight.

OUR START

At noon a gentle northwest breeze and fine, clear weather. Bell Island lay north 3 miles, west $1\frac{1}{4}$ miles, at noon. Eira Harbor is blocked with ice. No life is visible except a few "molly-mokes," or fulmar petrels.

We discovered an island about a mile long by half a mile broad, consisting chiefly of much-weathered basalt, off the east coast of Bruce Island. This I named Windward Island after our ship.

September 8th, Saturday.—At 10 A.M. we proceeded across the channel towards Northbrook Island to search for a landing-place.



MR. LEIGH SMITH'S HUT

Found a suitable spot in a small bay on the west side. But as the ice in the channel was breaking up and filling up the bay, we were unable to utilize it. We ran down the channel to Cape Flora. Tied up to the land floe and went ashore. We walked up to Eira Cottage, which we found with the roof off; water had got into everything, and every article was a mass of ice. I proposed three cheers for Mr. Leigh Smith and his party when we entered the hut, which was enthusiastically responded to. This is, or rather I should say was, a small hut, built of earth and stones and of what building materials could be saved from the wreck of

A THOUSAND DAYS IN THE ARCTIC

the *Eira* fourteen years before. Here the poor fellows had spent a long, dreary winter, almost dependent entirely for food upon what they could shoot. The greatest credit is due to those brave men, Mr. Leigh Smith, and his surgeon Dr. Neale, for the manner in which they brought all their men out of great dangers and difficulties and safe home again without losing a single life. Few know of the difficulties and dangers they had to face and



CAPE BARENTS

overcome. The hut was photographed. I brought away a sandwich-box in a leather-case (the former, strange to say, full of ice) to send back to Mr. Smith. We could not find Dr. Neale's letters, although we searched everywhere for them. We had to quarry out everything, as all articles are frozen as solid as the basaltic cliffs above.

September 9th, Sunday.—At 2 A.M. we started east along the land floe for Cape Barents to see if that is more suitable as a spot for habitation than Cape Flora. At 5 A.M. we tied up to the floe about three miles to the westward of it. I shot here a large old he-bear on the floe. I do not quite like the look of Eira Harbor

OUR START

as a winter harbor ; the ice is confined there, and is likely to prevent a ship getting out again in the summer. At 11.30 A.M. we steamed to Cape Barents.

The engineer reports that we scraped a rock half a mile off the Cape, but, after having boats out sounding all the afternoon, failed to find it.

Landed to ascertain if the spot is suitable for our headquarters, but found that the sea at times washes over the neck of loose bowlders running out from the cliffs, and also that the only spot possible to land upon is covered with bowlders. I decided to return to Cape Flora.

The cliff of one hundred and fifty feet is of much-weathered columnar basalt, and sticks out bluff into the sea with a low boulder-strewn neck, running out to a rise of about thirty-five feet towards the southeast.

We found a few pieces of pine driftwood, some comparatively recent ; also red snow on the base of the cliffs, which is produced by algæ (a low form of vegetable life). I shot a walrus after returning to the ship, which sank in seven and a quarter fathoms, and although we could see it lying on the bottom were unable to raise it. We tried with a harpoon fixed to weights and with grappling-hooks for two or three hours without success.

We made a depot, on the raised point at the end of the neck, of 600 lbs. of beef and mutton in 10-lb. tins, and covered it with stones, marking the spot by means of an upright piece of driftwood covered with a sack, and a meat-tin on the top. On the side of the driftwood I wrote in pencil on a clean-cut surface :

“ JACKSON-HARMSWORTH POLAR EXPEDITION.

Sep. 9, 94.

Head Depot at C. Flora.”

September 10th, Monday.—Arrived off Cape Flora and tied up to the land floe at 3 A.M. about three miles from the land. At 10 A.M. we let go, and steamed round the southwest corner of the floe to get in nearer to the land, as we found the ice too rough and broken to carry goods over it. I decided to make this our home.

Sounded off the southwest corner of Cape Flora to land goods and form our headquarters here. The ship is in five fathoms, one hundred and fifty yards from shore. At 1 P.M. we began dis-

A THOUSAND DAYS IN THE ARCTIC

charging the deck load. At 8 o'clock we started on watches of sixteen hours' work, eight hours' rest, coffee every four hours, the land party doing equal time with the crew.

The ship frequently broke away from the ice, owing to the high winds, and we had to remoor her. I yet hope to get the ship away, but the winter is fast coming upon us.

From midnight to 8 A.M. gentle north-northwest wind with snow. My watch is from noon till 4 A.M. next day. Sixteen hours is a long day at this heavy work, but I am most anxious to get the ship away, and it is our only chance of doing it. Every one works with a will. It is the only thing to avoid having the ship frozen in for the winter.

September 11th, Tuesday.—Moderate northeast wind, and overcast throughout the day. Position as yesterday. Carrying on similar work. Armitage sprained his ankle while hauling a sledge over the bowlders of the plateau to-day, and has to lay up. Seventeen degrees of frost most of the day.

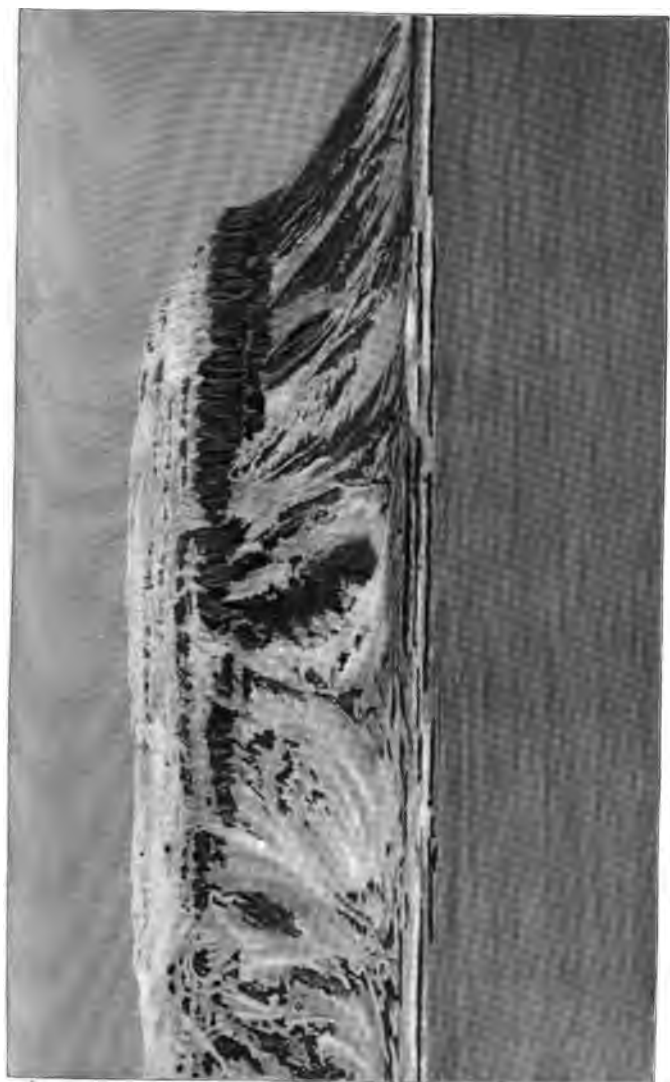
Armitage shot a walrus, which, however, sank.

September 12th, Wednesday.—At 4 A.M. all the deck load was discharged. Carried up the stores from the hold. Light north-west wind, veering to west towards midnight. Overcast most of the day, with eight hours' snow. From 8 P.M. bay ice has formed rapidly, owing to the temperature falling (18° of frost), the ice making it difficult to get the boats to and from the shore.

Some of my party are nearly played out from the very hard work we are doing and the long hours, and I have had to rest them. Every one has put forth his utmost efforts, knowing how much depends upon it.

Armitage's walrus came to the surface and was secured. It is a start for our larder, but a trifle unsavory one, as the carcass is blown out with gas and smells very gamy, but fresh meat is not to be despised.

September 13th, Thursday.—Wind shifted to southwest and southeast; light breeze. The bay ice is thick round the ship and in the small bay where we are landing stores. We had to knock off work from 4 A.M. till 10 A.M., as the boats could not be forced through the ice. At 10 A.M. a southeast breeze opened the ice, which closed in again at noon, again stopping us. I am afraid the ship will not get away this year, in spite of all our efforts. I am, however, fairly satisfied with her position for wintering, be-



CAPE FLORA

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NEW YORK 17, N.Y.

OUR START

ing protected by grounded bergs at the points of pressure, and she is also in a good position for getting away next year. I don't, however, relish the prospect of having the whole ship's company on my hands for the next nine months in addition to my own party, for all the responsibility of the matter will fall upon me.

Began walrus meat to-day—not a delicacy by any means. The collapsible barge for the ponies is so stiff that we cannot open it. The roofs of the canvas huts are also so stiff from frost that they will not meet at the joints. The crew have asked to be allowed eight-hour watches and four hours' sleep, instead of sixteen hours' work and eight hours' sleep; the land party continue as before. It is tough work, however, at this heavy work, and in this weather. The canvas huts are made of a light framework of wood and canvas, having the great advantage of being very light, and can be packed into a small space. I've brought four of them, which I find very useful as storehouses, but quite useless for living purposes on the 80° of north latitude, being too cold and the snow drives into them.

September 14th, Friday.—Overcast generally, with variable, light easterly and westerly winds. Armitage by observation makes the latitude 79° 57' N.

The boats cannot be forced through the young ice, which is also too weak to bear walking upon; consequently we are unable to work to-day, as we cannot reach the shore. We are, however, glad of a rest, enforced though it be.

Snow fell for three hours, and the wind got up towards night increasing in force.

September 15th, Saturday.—The gale has cleared out the bay ice on the seaward side of us, which returned at 1 A.M. on the 16th, with the change of wind to southwest. The wind arose with extraordinary rapidity, and fell as quickly. At 11.30 P.M. it was blowing a gale from east by south, and half an hour later was calm, with occasional light air from southwest.

We knocked off work at 4 P.M., owing to the bitterly cold wind and snow. When trying to return to the ship by walking over the thin floe, as the boat was so slow in trying to force its way through the gluey bay ice, it broke with me, and I fell through up to my waist; it was rather cool. I got out, however, without much trouble, owing to Mr. Child's smartness and promptitude

A THOUSAND DAYS IN THE ARCTIC

in pushing a piece of wood towards me. Earlier in the day one of the Ostiak dogs fell through some thin ice, and I had to go to its rescue by shoving in front of me a piece of wood to lay hold of in case the ice broke with me. After some trouble I managed to pull it out. These dogs show remarkable ignorance of the difference between safe and unsafe ice, which one would hardly expect.

A case of Cambridge sausages is discovered to have gone bad in the hold (twelve 2-lb. tins). The tins are so bulged as to burst the case. On being opened the contents smelt horribly. This is pleasant ! I hope the other food is keeping well.

September 16th, Sunday.—The crew refused to work to-day for the officer on watch, as it was Sunday. I went forward and spoke to them, and they turned to and gave no further trouble. We cannot afford to take holidays yet. Continued getting the timber for the log-house up the steep slope on to the plateau. Fine clear weather, light southwest wind till 3 P.M., and then shifted north, the sky becoming overcast with snow, and blew stiffly towards midnight. We find that the ice to-day is stronger, and we now do not attempt to force a boat through it to the shore, as it is out of the question.

All the dogs were allowed on shore to-day. They took advantage of their liberty to single out one unfortunate animal and tore him badly. I had him carried on board, and the doctor sewed him up and attended to him generally, but he died later on in the evening.

Started lime-juice, one ounce per day per man for the crew. I am very doubtful of its efficacy as a preventative of scurvy, and do not take it myself, neither do I insist upon the members of the land party using it ; but as the ship's company are under the Board of Trade, I see that they do. For should scurvy break out among them, "did they take lime-juice?" will be a question I shall be asked, and I shall be blamed if it be neglected to be taken. I believe that wholesome food, especially fresh blood meat, is the best preventative of this scourge of the Arctic ; and this I hope to obtain, although game at present appears scarce.

September 17th, Monday.—At 4 A.M. moderate northwest gale, gradually decreasing to a light breeze throughout the day. Barometer and thermometer rising. At work at 6 A.M. and

OUR START

continued till 6 P.M. Got all the timber for the log-house on to the plateau, and commenced building. We hoisted the union-jack on a flag-staff at the point of the plateau, all hands being present to see the ceremony, and gave three resounding cheers as our flag fluttered upward.

About 7 P.M. the doctor and I went for a walk round the point of Cape Flora over the East Glacier. Saw the tracks of a bear and a fox.

From the point of Cape Flora I could see Bates Channel and Miers Channel full of young ice, but with a clear channel between Windward Island and Bruce Island.

There seems to be next to no game here this year; all we have seen here yet in the way of life being a few walruses, kittiwake gulls, and a few mollymokes or fulmar petrels. This is due perhaps to there having been little land water till about the 7th of September, or else the birds had already departed for the south on that date. The looms, probably, had gone, but we did not see any on our way up.

I am getting very anxious about fresh meat for the winter, as there are between thirty and forty people to feed, but I hope that bears may soon put in an appearance.

September 18th, Tuesday.—Light northwest wind. Fair generally, but with light snow occasionally. At noon, with the thermometer at 23.8° F. and wind north-northwest, barometer at 30 inches, a very fine rain fell for an hour (probably indicating a shallow stratum of cold air near the earth, but with a warmer stratum above). This is remarkable. Went on with the log and canvas huts and carrying the provisions up the ice slope to the site of the huts.

The ice is increasing slowly in thickness. A walrus and calf were seen on a piece of ice to seaward, but were unapproachable.

The doctor and I went for a walk eastward after 6 P.M. as far as the edge of the glacier where it enters the sea in the bay to the east of Cape Flora. Here we found a quantity of driftwood, some of it looked like willow, but none is recent. No remains of the *Eira* to be seen.

The stars and moon shine brilliantly to-night. We have not seen a single loom or rotche since we reached Franz-Josef Land.

CHAPTER III

WINTER DARKNESS—DREARY DAYS

September 19th, Wednesday.—We continued the log-hut we had brought from Archangel in pieces. Each log being numbered to enable us to splice it together with accuracy. I had the hut put up in Archangel to enable me to see that nothing was missing. Continued carrying the stores up the steep slope to the site of the hut.

I sent Fisher and another man out botanizing, but on returning he reported that the vegetation is dead, and valueless for purposes of collecting.

In the afternoon the doctor and I started off to look for a practicable road north. We crossed the glacier round the cliffs to the eastward. Found that Northbrook Island was recently, at least, two islands, as only a low gully connects Cape Flora with the rest of the island.

We ascended the icy slopes of the rocks to the north of Cape Flora. I found the height by aneroid to be 1300 feet above sea-level. We tried to descend by the southeast side, but the ice slope being much fissured and very precipitous we retraced our steps. Found some shells, mostly bivalves, and an old whale-bone, apparently belonging to the *balæna mysticetus* on an old sea-beach near the point of Cape Flora, ten or twelve feet above the present sea-level.

As we approached the ship we saw that a bear-hunt was in progress, for a bear led on by the dogs had come up to the ship in its desire to stalk them, and so ended his days and was added to our larder. He had a quantity of straw in his stomach, which had been thrown overboard, no doubt, from packing-cases; I am very glad to get this meat.

At 8 A.M. barometer falling, wind shifting about to east and east-northeast, finally settling to north at 4 P.M., and gradually

WINTER DARKNESS—DREARY DAYS

increased to storm force at 2 to 3 A.M. on the 20th. Occasionally lulling to almost calm, and then bursting forth again in most furious gusts. Heavy snow falling from midnight to 9 A.M. on the 20th.

The ice anchors broke away and the ship got adrift about 2 A.M., and on two other occasions gave us much trouble. We had to get up steam to make fast again. The situation caused considerable anxiety. I feared that the gale would clear all the ice out of the small bay, carrying us with it. The grounded berg, however, held fast. I shall be glad when the ice around us is sufficiently strong to resist all weathers and make the ship fairly safe.

September 20th, Thursday.—The gale from the north lulled about 4 A.M. We found that one of the canvas huts, which had not been completed yesterday, was blown over the cliff on to the edge of the ice and smashed to match-wood, and many articles had been carried some distance away. Later on in the day part of the causeway, which we had laid over the bowlders to drag the goods over, was torn up and blown some distance. We started work after breakfast, but the high, bitter wind and driving snow was so trying that I sent all hands on board again, and only kept two men to help me to nail down the canvas and straighten things up to prevent further destruction.

Wind veered to west, and about 10 A.M. shifted to northwest and north, and increased again to a whole gale at noon. This is a windy spot!

At 8 P.M. the wind shifted to N.N.E. with similar force, and continued so with fierce gusts of storm force until midnight. We have now five lines out to the two grounded bergs (four steel hawsers and one manila rope). I hardly think that these will carry away.

Weather overcast throughout, with snow for six hours, and thick snow for four.

September 21st, Friday.—A whole gale from northeast is blowing, moderating and veering to north at noon, which continued till 8 P.M., and then decreased to a fresh breeze. All hands engaged on shore putting up the canvas huts, building the log-house, and dragging the stores up the ice-slope.

Weather overcast and cloudy generally. Repaired the causeway, which had been blown away, and got up two of the canvas

A THOUSAND DAYS IN THE ARCTIC

huts. We found the canvas frozen, very hard and unpliant, and the wood warped, rendering it difficult to put them up.

September 23d, Sunday.—I gave all hands a spell from work to-day, as I make it a rule to take a holiday from work on Sunday, unless there is some special reason for doing otherwise. Four of us walked over the floe to Cape Gertrude, four miles to the eastward, and explored that spot, which has a most barren appearance, and little vegetation is apparent. There is, however, too much snow on the ground to make a close examination possible. We crossed the foot of the glacier to the east, round the point of the basalt cliff, east of Cape Flora. Saw many tracks of bears and foxes, but no life, except a few snow buntings up on the rocks, one of which I shot as a specimen.

The wind from the northeast was bitterly cold, and very strong. I got my nose, both ears, and chin frost-bitten, and the doctor a finger. When returning we struck up the gully, through which the sea very recently has run into Gunter Bay, where we found some bivalve and other shells, high above the present level of the sea (six or eight feet above the present sea-level). A raised beach about fifty feet above the present sea-level is noticeable both on the edge of the gully (east side) continuing round the point of the high cliffs, and corresponding in height to the slope on Cape Flora, up which we have been dragging our stores.

Wind northeast, fresh to strong to 5 P.M., when it shifted to light airs from east, continuing so till midnight. Fine, clear weather, with almost cloudless sky. Barometer 30.42, and still rising.

A flock of eight looms were seen to-day on the edge of the floe. The first we have seen since reaching Franz-Josef Land.

A faint aurora visible to-night like cirrus clouds in streamers, from zenith to 30° above horizon from northeast to southwest.

One ounce per man of lime-juice served out to all the crew to-day. The doctor undertakes to see that an ounce of lime-juice is served out to each man daily, and that each drinks it. I am indifferent as to whether the land party take it or not. One or two are doing so as a refreshing drink.

September 24th, Monday.—We landed the ponies and stabled them in the hut—which is now nearly completed so far as the walls are concerned—while their stable is being built. We went



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WINTER DARKNESS—DREARY DAYS

on landing stores and dragging them up the steep slope to the site of the hut.

At midnight we observed the aurora during its fifteen minutes' duration. Bearing W.S.W. to S.S.E. Pale green in tint, arch in zenith and W.S.W., shaped like letter S in S.S.E. It folded up like a scroll of paper and disappeared towards the eastward. Armitage is taking notes of the aurora.

Of the aurora little is known—of the causes producing it none can speak. Those weird forms of light which silently move in ghost-like procession through the dim Polar night, and which the Esquimaux believe to be the souls of their dead at play, have little to indicate their origin or whence they come or whither they go.

The color is usually a pale straw and often limited to a single isolated patch. Sometimes of a pale green, and there may be several streamers at different points of the sky. Again the whole sky may be a blaze of light with pale-green streamers fringed with a beautiful rose color, and in rapid motion uniting at the zenith to form a corona. Suddenly those lights will die out and disappear into space, and then after an interval will reappear again and so go on. Little light is given, as a rule, by the aurora, and only on a few occasions have I known sufficient to cast a shadow. The magnetic needle is always agitated during a brilliant display.

September 25th, Tuesday.—Light airs and winds from S.E. and E.S.E. Five hours' snow. Overcast, but clearing towards night. Mist during the day, obscuring the land. The snow to-day, which fell heavily for an hour, was like fluffy down. It was very clear and crystalline.

We rigged an "endless fall" and "shear-legs" from the ship to the shore, dragging the sledges to the top of the cliff by the steam-winch, which enabled us to proceed very much more rapidly, although I much begrudge the coal which this necessitates burning; but time is valuable. We continued getting up the stores and proceeded with building the log stable.

The aurora visible from 11.40 P.M. to 11.50 P.M. Clear overhead, alt. 60°. Pale green in color with pale bands, bearing S.S.E., and moving from south to north. Lowest temperature to-day, 4.2° F.

There is bay ice as far as the eye can reach with two or three

A THOUSAND DAYS IN THE ARCTIC

spaces of open water here and there. The ship has quite a spectre-like appearance with the rigging white with hoar-frost and snow, several inches in thickness.

September 28th, Friday.—Light south winds until 10 P.M. Light to moderate southeast winds to midnight. Overcast throughout the day. One hour's snow. Misty over the land.

We landed and stacked coal on the northwestern side of the hut to-day, forming a rampart of bags of coal. The stack is a protection to the hut from westerly gales. We landed and stacked in bags six tons of coal.

September 29th, Saturday.—We landed and continued sledging up the coal and stacking it near the hut as yesterday. Stacked eight tons.

Light east winds and overcast throughout. One hour's snow. Lanes of water opened up to south and west of ship in the morning, closing towards night again.

Bailey called me at 5.30 A.M. (in accordance with orders I had given to call me either night or day in event of any game putting in appearance), saying that a bear could be seen. I turned out, but found he was away to the south on the young floes about three miles off, and too far away to get him. I had a fire lighted on the floe, and bones and fat burned, to make a smell to try and attract him, but as the wind did not blow directly in his direction he did not appear to notice it, and eventually disappeared in the direction of Bell Island.

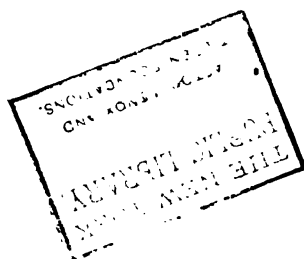
Child succeeded in repairing the musical box, much to the joy of all. We set it going again and had a concert in the evening, each man doing his best as a vocalist, and all joining vociferously in the choruses; we are always a very merry party.

September 30th, Sunday.—The doctor read prayers as usual. Light easterly airs and calms and overcast generally, very thick mist all day. The thermometer at zero at 4 A.M. A very thick frost-rime of four inches deep formed during the day on the weather side of the spars and rigging, giving the ship a still more Arctic appearance than usual.

Spent most of the day in instructing and practising with my party in ski-running down the slope under the rocks. Some progressed fairly well, but others found that lying on the flat of their backs when at the top of the slope the only secure position, and caused great amusement. We all thoroughly enjoyed it. We

A SKI PARTY





WINTER DARKNESS—DREARY DAYS

had our usual concert in the evening, with often the musical box as an accompaniment—"Rule Britannia," "John Peel," "Drink, Puppy Drink," and other sporting songs being the favorites. Armitage is very good in being always ready to sing when asked. He has fortunately brought a number of songs with him.

Dunsford keeps us amused by relating his experiences when serving with the French during the Franco-Prussian war and with the British in the Soudan. The skipper also tells us of his adventures when fighting for the North in the American civil war.

It is a very fortunate thing for us that we have the log as well as the canvas huts—the latter would not be at all satisfactory as living-houses in these latitudes, but come in well for stores.

October 1st, Monday.—In the afternoon we opened some of the cases of furs and put them in the huts. While so engaged a bear was seen on the ice in the direction of Bell Island. Armitage and I started off with our rifles to shoot it, accompanied by two dogs. The bear on seeing the dogs made towards them, who, not liking the look of him, retreated behind us. We lay down behind a hummock, and he came up within fifty yards of us when I fired. The bear gave a jump in the air on getting my bullet in the chest, but wheeled round and set off at a great pace, receiving four more bullets from me in the hind-quarters as he went, at from a hundred and fifty to three hundred yards distant.

Then all my cartridges gave out, and Armitage having expended all his, he returned to the ship, about a mile off, to get more; I followed the bear, which had made for the land, to keep him in view. He was bleeding profusely. Six or eight dogs then caught sight of him, and much to my annoyance kept him moving on. After about half an hour, Armitage, accompanied by two others, returned, and I resumed the chase, following the bear for three miles across some thin bay ice, getting in another shot behind, but still without stopping him. Eventually we came to a channel kept open by the tide and current from Meirs Channel, and having only small pieces of loose ice and snow packed up in it, and in trying to follow the bear I got in and had to return to firmer ice. I clambered on to a berg, and with Armitage, who had then come up, got a shot each into him as he moved along about two hundred yards off on the other side of the channel. He then lay down and apparently died at once. We searched all round, but could find no means of reaching him, and

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were forced to leave him until to-morrow, when we can bring with us sledges to enable us to get over the unsound ice. I used my sporting .303 rifle.

October 2d, Tuesday.—Started off with "John" and Dalziel of the crew, and the doctor and Fisher of the land party, with three sledges, to try to recover the bear shot yesterday evening. On arriving at the spot we found that the ice had opened, and that all traces of him had been carried away by the current, where he had been lying being now open water.

We got back to the ship, after an eight-mile tramp over the floes, about 2 P.M. A bitterly cold, strong northeast wind was blowing in our faces when returning. The wind then got round to E.N.E., with snow. Misty and overcast all day.

We worked under difficulties, owing to the vile weather during the afternoon, dragging the remainder of the hay up, and stowing articles in the huts.

October 3d, Wednesday.—Blowing from E.N.E. and N.E., in strength varying from a strong breeze to a moderate gale. Overcast with heavy falling snow up till noon, and then driving snow, forming deep drifts, till 11 P.M., when the wind lulled. Thermometer rose to 18.8° F.

It being difficult to continue any out-of-door work, Armitage, the captain, and I went up to the log-hut, and directed and helped the Russian and the ship's carpenter in dividing the interior. All the other hands and the rest of the land party remained on board and stayed below, except the doctor and Fisher, who went out on the ice for a few minutes after dusk, and came back and reported a bear near the bows. I took my rifle and searched, but could neither find it nor any tracks. It doubtless belonged to the new species of bear which has recently become very common, and which I have named *Ursus Koettlitzii* et *Fisherii*—in other words, yellowish hummocks of ice.

October 4th, Thursday.—Moderate gale and overcast, hazy weather, with fierce gusts of wind. Force of wind from 9 to 10, with driving snow. Direction of wind northeast.

The wind blows the ice away to the southward off the land floe, which is held by the bergs, and the ice is seldom sound more than a mile from the shore; past that point the strong currents and high gales keep it in a broken-up condition and in constant motion. At 1 P.M. a bear was seen on the berg near our landing-

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place. I went after him, approaching within ten yards of him, and planted a bullet in his neck, it going right through, but without stopping him. He then made for the bergs at the edge of the floe, and Armitage put two bullets into him as he passed. The dogs had followed him, snapping at his heels, which delayed him, as every now and again he would turn and make fierce short rushes at them, and then on he would go again. He stood at bay for a minute or so before receiving Armitage's second bullet, then took to the water, roaring savagely, and escaped. I followed the edge of the floe for a mile or so, expecting him to return to it, as he was badly wounded in three places, and it must be some miles to the nearest ice to the south (the direction he took); but he did not do so.

Moving stores into the huts from the ship.

October 5th, Friday.—At 4.20 P.M. sighted a bear on the floe to east of the ship. Two of my men and I stalked him and almost surrounded him. I shot him behind the left shoulder, and brought him down. Armitage was using a government .303 rifle, which froze at the striker, owing to its being oiled, and would not go off (temperature 3° F.). We took him on board and skinned him, adding the meat to our larder. He was a he-bear about three-quarters grown.

Remarkable sunset this evening of dusky red, with a long column of light in contact with it and about 15° above the sun. About 20° to the south a similar one appeared parallel to the first one. This was no doubt caused by refraction, and bears considerable resemblance to a sunset I once saw on the Petchora River in northeast Russia in the winter of 1893.

October 6th, Saturday.—Continued carrying provisions into the huts. Strong northeast wind, increasing to moderate gale at 8 P.M., and fresh gale at midnight. Fierce gusts throughout, force 8 to 10.

Clear weather and no snow falling, but snow drifting before the wind.

Continued stowing away provisions in the huts, and cutting ice from the fresh-water pond near the log-hut for use during the winter.

We began using the leather Lapp laipeshko, discarding the Russian high boots, which are now too cold for wear. I gave the crew one of our footballs to amuse themselves with on the ice,

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and just now football is all the rage when work is finished for the day.

October 7th, Sunday.—Still blowing hard and cold, with a temperature of 5° to 7° F. About 10.30 A.M. Heyward came rushing into the cabin in great excitement to say that the carpenter Sharpe, and Allan the engineer, while walking near Leigh Smith's hut had fallen in with a bear (Allan being some distance from the carpenter at the time). The carpenter, while sheltering from the cold wind and waiting for Allan to return, suddenly espied the bear a few yards away. He at once sprang upon a large bowlder near which he was sheltering to get a position of vantage; the bear followed and planted his fore-paws upon it preparatory to clambering up after the carpenter. He drew a revolver, which snapped about five feet from the bear's face in a way that some revolvers have on occasion. The dogs, which had now come upon the scene, at the same moment drew away the bear's attention, enabling the carpenter to spring from the bowlder and run for the ship, which he reached in a breathless condition, doing record time I believe. I hurriedly snatched up my rifle and started off, as the carpenter felt anxious about Allan, who was still in the neighborhood of the bear. He, however, had seen him at a distance, and had kept out of harm's way by climbing up the talus. On going out upon the floe I met "Mr. Bear" about three hundred yards to the eastward, near the floe-berg, marching towards the ship. With the help of the dogs I managed to approach within five yards of him, and planted a bullet behind the left ear which bowled him over. All hands turned out to sledge him in. He was a very large he-bear. I named the rock, where the carpenter had his little adventure, Sharpe's Rock, after him. Dimensions of bear :

Along belly from the tip of the nose to tail . . .	8 ft. 1 in.
Along back from the tip of the nose to tail . . .	7 ft. 9 in.
Girth round the ribs (lower)	7 ft.

I photographed him on the sledge, when we had dragged him to the ship, with the carpenter. We had the heart and tongue for dinner, which are very good indeed. I have given orders that no one is to go far from the ship without a rifle.

Fresh N.N.E. gale, decreasing to moderate gale at 4 P.M., and increasing to strong gale at midnight. Fierce gusts of wind, but

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much steadier to-day. Sky clear, and no snow falling. We all went for a walk in the afternoon towards the glacier to the east of us. We found in a snowed-up gully coming from the rocks a deep hole dug out of the snow by a bear, being a rounded cavity three or four feet deep, which suggests that it intended lying up there. There is every probability, however, that it was dug by the bear which I shot this morning. The government .303 rifle, which the doctor brought out, again froze (temperature 16° F.).



"AND PLANTED A BULLET BEHIND THE LEFT EAR WHICH BOWLED HIM OVER"

This is due to the oil not having been carefully removed from the striker.

I have been hoping to make a start depot-making for some time past, but with these perpetual gales it is impossible. I am also very busy with other things.

October 9th, Tuesday.—Fresh southeast wind, increasing to a moderate gale, from east-southeast, with hard gusts, force 9. Thick driving snow till 8 P.M., when the wind moderated and shifted to northeast. In the morning we stowed a number of cases of spirit on the top of the biscuit-cask wall to increase the

A THOUSAND DAYS IN THE ARCTIC

height of it and so protect the hut. The weather was too bad to continue work outside in the afternoon. I went ashore to superintend the building of the Russian stove, which Maxim, the Russian, does not understand. The weather to-day is vile. A Finn, named Blomkvist, of the crew, knows something of these stoves, which are about seven feet high by three feet in diameter, with an aperture for wood to be burnt in at the base, and flues above connected with large, oven-like spaces. Ours, however, fails to work very well and occupies too much space.

The plateau below the rocks of Cape Flora is swept quite clear of snow by the wind. The only portions of Franz-Josef Land clear of glacier that I have yet seen are those protected from the ice sheet by rocks behind, and swept clean of snow by wind. At such spots it is possible to find a suitable site for a hut; elsewhere the land is covered by glacier, with the exception of low islands, such as Bell Island.

October 10th, Wednesday.—At midnight we observed the aurora to northwest and west arched, with a long streamer to northeast, of a pale, yellowish-green tint. It was like rays thrown by the sun from underneath clouds.

October 11th, Thursday.—Calm and light easterly airs till 6 P.M., and then light W.S.W. wind, and again calm and gentle E.N.E. wind at midnight. With the exception of mist surrounding the base of the hills, which cleared about 7 P.M., there was fine clear weather throughout. Temperature most of the day, 10° F. Fitted up the observatory we had brought with us in sections, but found it very flimsy and quite unsuited for this climate. Took it down again and stowed it near the stable. My fellows to-day hoaxed the skipper by sticking a wax hand, which was found in the sleeve of my sealskin coat (a reminiscence of a Grafton Gallery party), in a snowdrift at the foot of the cliffs. He imagined it to be part of a real body buried in the drift, in which they all encouraged him and fooled him to the extent of his bent. He rapidly came to the conclusion that it was the body of one of Mr. Leigh Smith's men, of whose death he guessed nothing had been said, and even surmised foul play.

He chided Armitage and others for light conduct when their suppressed laughter bubbled to the surface, and discussed the solemn way in which the supposed body should be buried. He intended taking Crowther with him while the disinterment was



SHARPE'S ROCK IN AUGUST



WINTER DARKNESS—DREARY DAYS

going on and to watch him—à la Hamlet watching the King—for he imagined that the Leigh Smith party had committed a murder while wintering here, and that poor Crowther knew all about it. The skipper accounted for the difficulty we had in pushing through the ice to Franz-Josef Land by his reluctance to visit the spot of the murderous deed. He also proposed to clap him into irons during the winter, and he himself to return with his prisoner to see that justice was done. He then proceeded with great care to dig the corpse out of the drift, when the wax hand suddenly tumbled over. Tableau!

Late in the afternoon we got out the football and amused ourselves by kicking it about on the floe. The Russian stove is finished, but it does not work satisfactorily, having too great a draught, and half the heat is wasted.

An aurora at midnight—pale-green tint. Standing E.N.E. to W.S.W., with a huge arch varying in altitude from 10° E.N.E. to 50° at the centre and 20° at W.S.W. extreme.

October 12th, Friday.—North gale increasing to strong gale at noon, shifting to N.N.E. at 8 p.m., and decreasing to fresh gale. Fierce gusts throughout of force 10. Clear sky, with driving hard snow from off the land. Temperature greater part of the day 13° F.

Started calking the log-hut with oakum. Maxim, the Russian carpenter, and I took the shoes off the four ponies, as they will be far better without them.

I got my nose frozen twice while crossing from the ship to the house, a distance of four hundred yards. One of my men also had his cheek frozen.* While going to the house in the afternoon the force of the wind was very great. It was blowing so hard as to render it difficult to stand against it. I kept all the

* A frost-bite comes on almost imperceptibly. The face has become very cold from the bitter wind, a white spot appears on the nose or cheek, but without any marked change of sensation, and one is usually informed of its presence by a friend. This increases in size, is hard and without sensation. The best means to remedy this is to place a warm hand over it and very gently rub until it disappears. To rub the spot with snow is a mistake, for the skin being in a tender condition, it is easily removed, and a raw place is the result.

Frost-bites taken in time are not dangerous, and the only result of most is perhaps a peeling of the skin and a raw place for some days.

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others on board the ship in the afternoon, as the force of the wind and the low temperature and driving hard snow rendered it too unpleasant to work in.

One of my reindeer sledges got adrift, and was carried on to the floe from near the hut by the high wind and smashed to match-wood.

October 13th, Saturday.—A strong northeast gale blowing, increasing to a whole gale at 4 P.M., and decreasing to moderate gale at midnight, with fierce gusts of force 9, 10, and 11. Tried to bring up the steep slope a number of articles that had been blown over, but the wind was too strong to enable me to do so. Stowed them away on the lee side of some hummocks upon the floe until there is less wind.

The ice outside of our land floe to the south and southwest is again driven away, and the frost smoke is rising in clouds from the open water. About four hundred yards outside of the ship the ice parts after a gale. It is the grounded bergs that have always held the ice inside of them. There is very little daylight now, and we have to keep the lamp burning all day in the cabin. Since the sun set after the perpetual daylight of the summer the daylight has diminished rapidly, and night has increased in length as days went on. Now only three or four hours of sunlight are given to us about noon, and soon we shall lose the sun altogether, and the grip of the dark polar night will soon be upon us, not to be released for four long, dark, dreary months.

October 14th, Sunday.—Fresh northeast wind, moderating to calm at 8 A.M. At noon light north airs. At 4 P.M. calm. At 8 P.M. light N.N.E. winds and airs at midnight. Overcast and cloudy during the day, clearing at 6 P.M.

The Rev. Dr. Koettlitz—as we call our doctor—read prayers as usual at 11 A.M. We all played football on the floe for an hour or so afterwards. I exercised the light brown mare pony in the sledge, but found her to be a gibber apparently and without any life or go in her. After lunch we played football again for an hour and a half (four a side), and I exercised the black pony, found him to be a delightful roarer (or else the cold he has may account for it). It doesn't look a promising stud!

About 5 P.M., after dark, while passing the base of the cliffs, I discovered by the aid of the dogs a she-bear in a hole in a snow-drift, where she had evidently intended to lay up, the fierce gales



AN ADDITION TO OUR LARDER

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of the last few days having doubtless hurried this on. I ran on board for my rifle, and the skipper and two of my men followed me with rifles. I killed her with one shot, with a soft-nosed bullet from my .303 rifle, placed just under and a little behind the left ear. We put a pony in a sledge and dragged her into the log-hut for the night to prevent her freezing. When we gave the dead bear a start down the steep icy bank of the talus, she glissaded down at a great pace, nearly overwhelming the skipper, who was standing in the line of the slide, causing much amusement to people around and ire from him, poor chap! The bear's lair was about four inches below the surface at the dome, and quite shut out from the open air, with the exception of a small breathing hole, towards which the bear kept her hind-quarters. She had filled up all the entrance behind her but this small hole. The dogs smelling and yelping at it aroused her, and made her burst through the hard snow above her head.

I shall start to the northeast to-morrow to make a provision depot if the weather will only permit.

At 8 P.M. observed aurora, pale green. West to east. From 10° above west horizon across zenith and 50° above east horizon, in arch with several streamers from it, with another small arch at the western extreme of the large one.

Crowther tells me that during this time of the year, when they wintered here in 1881 to 1882, they had chiefly south and southwest winds, which were much warmer than the north and northeast winds we are getting now.

"Carlo," the large retriever I brought from England, killed an Ostiak dog to-day. I shall tie the dead dog round his neck for a few days to try if that will break him of fighting. Lickings have no effect on him. He has always been very pugnacious, and has never lost an opportunity of indulging in pitched battles with any dog that will accept a challenge from him, always to the detriment of the other dog who accepts it. He swaggers about among the sledge-dogs with all the supposed airs of the Britisher abroad, with quite the attributed Irish query in his attitude of "Will any one trid on the tail of me coat?"

October 15th, Monday.—Light breeze at 4 A.M. Moderate breeze at 8 A.M. Moderate gale at 10 A.M. Fresh gale at noon. Temperature 12° F. Blowing hard again and very cold. No chance of starting northeast while this weather lasts. At 4 P.M.

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a whole gale is blowing. Gradually decreased to light northwest and north winds at midnight.

None of the expedition left the ship to-day. I went to the hut to attend to the calking of it, etc., and did a few odd jobs; building even such a little place takes time in such weather.

At 8 P.M. observed aurora. A narrow band across zenith east to west. Altitude 70° at each extreme. Three streamers arising from northwest horizon to an altitude of 15° . Pale green in color.

October 16th, Tuesday.—Still blowing, with a temperature of 12° F. Another man and I took the pony and sledge to Leigh Smith's hut to fetch a cask lying on the beach. We had there considerable trouble with the pony, as it would not face the bitterly cold and strong wind when returning. The sledge was blown over several times, and on one occasion the pony nearly followed it. Broke a shaft and had general trouble. Got my ears a good deal frozen, owing to my cap being a little slack. Finished the Russian stove, using clay and brick. It now appears to work better and to give out sufficient heat, and is a great improvement on the first one built.

At 3.30 P.M. the doctor and I went off for a walk towards the point of Cape Flora. It was still blowing hard and snow driving, and the thermometer at 2° F.; but I must get exercise somehow.

I climbed the talus up to the rocks near the summit of Cape Flora, taking my best bear-dog to discover any lying-up bear there. I want more meat for our larder and dogs.

I measured the thickness of the young floe to-day and find it to be $12\frac{1}{2}$ inches: this is excluding the little snow there is on the surface of the ice.

At 2 A.M. moderate north wind. At 4 A.M. strong northeast wind, increasing to fresh gale at noon and gradually decreasing and veering at 8 P.M. to moderate north wind. At midnight, moderate N.N.E. wind. Fine but overcast weather.

October 18th, Thursday.—At 4 A.M. light north wind. At 8 A.M. light northeast wind, increasing to fresh wind at 8 P.M., and decreasing to light wind at midnight. Fine clear weather throughout.

Cirrus, and cirro-cumulus clouds of solid appearance, like thick drifts of snow, with very rounded backs, dark colored and tinged with red and pink, were visible from 10 A.M. till 6 P.M. in north-

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west and west position of the sky at an altitude of 40° . While the sun was visible very long regular lines of cirro-stratus clouds settled parallel and over one another for 15° above the sun. Sky of a light-colored, very clear blue. There were about a dozen cirro-cumulus clouds which did not move during the times mentioned.

Went for a walk in the afternoon, Armitage, the doctor, and Fisher accompanying me along the margin of the open water about three-quarters of a mile from the ship towards Miers Channel and the west point of Cape Flora, in the hope of meeting with a bear, taking the dogs with us. We found it quite calm at that point, while a moderate to fresh wind was blowing at the ship, both when we started at 3 P.M. and when we returned at 5 P.M. The winds here certainly appear to be somewhat local and blow from the high land, as they do at Trieste. Occupied all the morning in collecting fragments of the observatory and other *débris*, which the gale had blown over the cliffs on to the floe, and in carrying them up to the hut.

An aurora, from 8 P.M. till midnight, northwest to east, pale green, moving towards the southeast in arches and streamers, appearing and disappearing like the rolling up of scrolls of paper.

October 20th, Saturday.—Light to strong northeast winds, and fine but cloudy weather generally. Misty at times, and three hours' snow. At 3 A.M. temperature 12° F. We put up a dog-kennel out of the broken pieces of the canvas hut. The carpenter reports that he cannot make a job of the observatory, which is too flimsy and will certainly blow away. I shall have to take on shore the after-galley and use it as an observatory after drawing all the iron nails and replacing them with copper ones. As we shall use it for magnetic observations, any iron in the building would affect the needle of the unifilar magnetometer and other instruments.

October 21st, Sunday.—The doctor read prayers as usual. We played football on the floe, a strong wind and a temperature of 10° F. making it a rather doubtful enjoyment. I lent the crew a rifle to induce them to go out for a walk in search of a bear or a walrus, and thus get a little exercise, which is a difficult matter to induce them to do, as they do not like to face the cool wind. I requested Dr. Koettlitz to inspect the quarters both of

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the crew and the ship's officers, and to report to me on their condition.

Weather: At 4 A.M. light N.N.E. wind, veering to north and increasing to moderate gale by noon, and gradually decreased and veered to light E.N.E. at 8 P.M. Fine but overcast generally. Misty at times and two hours' fine snow. Aurora visible at 5.30 P.M. Two long streamers close together and running parallel from east to west across zenith in a large arch. Altitude, west extreme 40° , east extreme 10° of a pale-green color.

I received a report from Dr. Koettlitz, of which below is a copy :

"CAPE FLORA FRANZ-JOSEF LAND, *October 21, 1894.*

"*F. G. Jackson, Esq.:*

"SIR,—I inspected the quarters of the men in the forecabin as well as the galley, and those of the officers between decks to-day, and was satisfied, on the whole, as to their sanitary condition, with the exception of one or two defects, which I now point out :

"1. There has been a leakage from the deck into the bunk of the boatswain. I recommended that it should be thoroughly cleansed by washing with Condry's fluid, pending the time when the thaw sets in and the deck can be calked. This will probably remedy the defect.

"2. The bunks of the firemen, being dirty, that they shall be cleaned.

"3. The bunks of the men Mouat and Dalziel being damp, that the mattresses should be taken out to the galley-fire and be thoroughly dried.

"4. A ventilator of the forecabin being closed because of a draught when the weather is windy, I recommended that it should be opened, and that a canvas cover, or something which will answer the purpose, be placed over it to prevent the wind from blowing through it.

"5. That to ventilate the galley a small scuttle between it and the deck be opened daily.

"I have the honor to be,

"Your obedient servant,

(Signed)

"REGINALD KOETTLITZ, M.R.C.S., etc."

October 22d, Monday.—At 8 A.M. I was told that the dogs were barking around some black object on the ice near a berg about a mile and a quarter from the ship. Accompanied by Armitage I started off with my .303 rifle, the boatswain and another man following. We found it to be two walruses—two bulls—lying side by side at the very edge of some thin bay ice. We killed them both, but one in his dying struggles rolled on to the thin bay ice, which broke, and he sank. The other we at first tried

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by means of the ponies to drag to the ship, but two ponies and ten men could not move it a yard. It measured about fourteen feet in length, with proportionate girth, and must have weighed a couple of tons. We finally skinned and cut it up where it lay—a difficult matter, as the skin and, for some distance down, the flesh, had frozen hard; we cut it up into joints, which we sledged to the ship for our larder. These operations took most of the day.

I am having all the blood from the animals killed kept and frozen. Every day a pound or so of the frozen blood is chipped out with an axe and added to our soup. This, however, does not improve it in flavor, as it gives it the peculiar taste of walrus, which is not a pleasant one.

None of us are at all in love with walrus meat. It is very tough, coarse, and dark in color, and has a distinct flavor of iodine. Bear is decidedly better, but, although we considered it very good meat in the Arctic, yet in England it would hardly be viewed as a delicacy. It is tough, flavorless, and coarse, and somewhat resembles beef in appearance; great care must be exercised to avoid cooking any fat with the meat, all must be carefully excluded, otherwise it imparts an extremely unpleasant flavor. I should much like to place either walrus or bear cooked à l'Arctic before the average London club-man, and watch the expression on his countenance, and listen to his remarks on the subject.

Walrus-shooting in bay ice is always more or less risky sport, from the fact that they have a way of almost invariably lying upon ice of a dangerous character and near the drifting pack at the edge of the fast ice. There they lie, with their tails almost in the water, looking at a distance like a number of large leeches. As we approach they raise their heads and look at us with their round staring eyes, as if to inquire by what right we venture to trespass upon their domain. If we remain quite still they will probably drop their heads again, but on approaching they became, as a rule, alarmed, a wild bellowing and snorting begins, and one or two slide into the water. Now it is time to fire, great care being necessary to shoot them in the head, and so kill them quite dead, for if any life be left in them they will roll into the water and sink.

I have sometimes seen pathetic sights of mothers with their

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cubs, endeavoring to shield them from danger by clasping them with their flippers and swimming with them in their embrace. In cases of the young ones being shot dead, the mother has come up, and, seizing the cub with her foreflippers, has disappeared with it in the depths of the sea. I always avoided, when possible, interfering with either the mother or cubs, but singled out the bulls. In the water, walruses, especially bulls, may be really dangerous when irritated, and often quite unprovoked, from sheer pugnacity of nature, will "go for" a boat, and, with their enormous tusks and great weight and strength, will tear a hole in it and sink it. The unfortunate occupants would probably then have a bad time, should, as would probably happen, the walruses devote their attention to them. The bulls are far more pugnacious than the cows, and frequently, without any provocation at all, will assume the offensive.

Once, in our first autumn in Franz-Josef Land, after the sun had left us, a companion and I were standing at the floe-edge watching a small herd of cows and cubs disporting themselves a short distance off in the water. Suddenly a large bull put his head above the water and came straight for us, bellowing angrily, and proceeded to clamber on to the ice, evidently with the intention of turning us off it. Unfortunately my companion fired at him, and he fell back into the water. I should have liked to have seen his method of carrying on war. On another occasion we were flensing some walruses we had shot upon a floating piece of ice about 12 x 12 feet in size, when a large bull charged at us from the water, snorting and bellowing, and evidently in a very unpleasant frame of mind. I had just time to shoot him through the head as he gained the surface of the ice piece. There was not room for us and him, in a rowdy mood, too, so I had to dispose of him, poor chap. He was doubtless annoyed at the slaughter that had been going on, and meant to take it out of us.

Their tusks are very powerful and of strong ivory. Their chief uses are for fighting with, to aid them in getting out of the water on to ice, probably for stirring up their food from the bottom of the sea, and in knocking holes through thin ice from underneath, to enable them to clamber through to the surface. On several occasions I have seen them so engaged, lying on their backs, tapping and working their tusks round and round, thus

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gradually enlarging the hole. Their chief food in Franz-Josef Land is shell-fish (bivalves), sea-urchins, and other comparatively small marine life. Often, on the surface of the ice around their holes, I have found small heaps of shells and small stones. These at first puzzled me to account for, but on examining the stomachs of dead walruses I found them to be very contractile, and when empty are reduced to a small size. This being doubtless a provision of nature to reject the indigestible shell after the contents have become assimilated.

The pebbles are no doubt swallowed to aid digestion by crushing.

October 23d, Tuesday.—I again visited the spot where I shot the walrus yesterday, and badly wounded two more which kept hanging about the blow-holes in the thin bay ice; but I was unable to get near enough to harpoon and secure them, owing to the ice around being so weak. I spent the day trying to get them, and tried to approach them with a light Norwegian sledge, but the ice bent so under me that I had to desist.

Saw two dovekies partially in their white winter coats with black markings on the back. The sun is now quite gone, and only casts a rosy glow over the southern horizon for a few hours about noon.

Weather: Calm and light southwest airs till noon, then light airs and winds from northeast and east. Overcast and foggy from 8 A.M. till 4 P.M., and fine clear weather during the rest of the day. "Frost smoke"* in great clouds over all open water, and the bay ice making very rapidly.

October 24th, Wednesday.—I again went to the spot where we had left the wounded walruses yesterday evening. One had disappeared, another was at a small hole with its nose just above the ice, but the latter was too thin to approach it, and there was no part of the walrus visible in which a harpoon could be fixed. We tried all the morning to secure him, but without success. A strong wind sprang up, and I got my right hand and nose frost-bitten.

In the afternoon we cleared out the "after-lockers," and carried the contents ashore to the huts.

* "Frost smoke," which looks like thick smoke rising from a fire, is caused by moisture rising from open water, and becoming condensed on coming in contact with the cold atmosphere.

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Weather: Light easterly airs gradually increasing to a fresh breeze at 10 A.M., and continuing the rest of the day. Fine clear weather throughout. Could see great distances to-day, the atmosphere being very clear. Aurora at midnight arched across zenith from east to west in a large band. At each extreme 15° above the horizon. Streamers from north and northwest, with the main streamer moving to northwest. Color, pale green.

October 25th, Thursday.—We tried again to secure the wounded walrus, but he disappeared about 11 A.M., owing to his inability to keep the blow-hole open. He probably was drowned.

We continued taking small articles ashore, and stowing them away in the huts.

Weather: Moderate to light east wind till 10 P.M., then veered to light southeast wind. Overcast, misty weather generally. Slight aurora at midnight of pale green. Four short streamers 15° apart around ursi major and minor.

October 26th, Friday.—A report at 8.30 A.M. of "something" black on the ice about a mile and a half from the ship to the south. I called two of my men and we started off. We found seven walruses lying together, close to a blow-hole surrounded by bay ice. The dogs which had followed us, however, drove them off the ice into the water hole in the bay ice. We wounded four, two of them severely, and they (one of them a cow with a cub) tried to clamber on to the floe. I returned to the ship for a harpoon, gun, and a few hands to help us to secure them. On coming back we found that one was lying on the ice. I tried the harpoon gun on it, but it hung fire so badly twice that it exploded after I had taken it from my shoulder, quite three seconds after the cap had fired, probably owing to the cold having contracted the communication between the nipple and the powder chamber. I finally killed it with a bullet at the back of the head from my .303 rifle, and it was secured by a seal club as it rolled into the water. We tried till 2 P.M. to secure the mother and cub, but the cub got shot by accident in the midst of some bay ice, and we could neither move her from the spot nor reach her with a harpoon or club.

Weather: Calm in the morning, fine but cloudy generally; at noon light southeast airs. From 2 P.M. till 8 P.M. light E.N.E. winds. At midnight light E.N.E. winds and overcast.

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October 29th, Monday.—I took a walk out to the floe edge, being accompanied by two of my men with our rifles to endeavor to increase our stock of fresh meat. While watching a small group of walruses about one hundred and fifty yards from the floe edge (among which were a cow and a cub) a bull walrus came towards me and proceeded to clamber on to the floe edge about five yards from us, bellowing at us all the time. One of my companions unfortunately fired at him as he got on to the ice and he disappeared. He evidently intended to try and clear us off the ice, and it is a pity that he was not allowed to try, as it would be interesting to see how he would go about it.

I did a few jobs in the hut in the afternoon, and about 5 P.M. had a run on my ski across the floe. It is now quite dark by 3 P.M., and only twilight for a few hours at mid-day.

At 6 P.M. observed brilliant aurora, pale but vivid green, in large band from east to west. At 6.45 P.M. thick cloud-like form of aurora covering ursus major, which it concealed, being of a very brilliant pale-green color. It sent out long streamers to north and northwest and moved rapidly to west. At 8 P.M. aurora moving rapidly from east to west and from north to south in many arches and streamers, entirely covering the sky. The stars shone through all the other parts of the aurora except the one mentioned above. The ice cracking and groaning loudly at the shore caused by the tide.

October 30th, Tuesday.—Report of walruses on ice about two miles to south at 8.30 A.M. They were loudly bellowing and making a great noise. I started off with Armitage, taking young Heyward with me, the rest of the party following. We found about sixty lying near some bay ice, with a large hole by them. They were chiefly composed of cows and a few cubs, with some bulls lying as outposts around them. As we approached a wild bellowing and snorting began, and on the firing commencing an indescribable scene of confusion took place. All the huge herd made for the limited water space, splashing, bellowing, and snorting; and these sounds, intermingled with the repeated rifle-shots, suggested a battle in progress. Three were shot dead at once, and others were badly wounded. We secured three; two others sank before we could get a hook into them. Armitage fell through the ice, and unfortunately lost the new .450 Henry Express rifle. I afterwards shot three more walruses. One sank

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before a hook could be put into it, one we secured and landed on the ice, but the third I shot, and fixed a seal club and harpoon in it; owing to the ice which was in motion crushing down over it, and the ice around being too rotten to haul upon it, with darkness coming on, we had to make a line fast to the club and harpoon, securing the other end to a boat-hook stuck in the ice. This we were obliged to leave till morning, hoping that the ice would not move more and that the frost will strengthen the ice around.

I had the black pony and sledge out, and the meat and skins were dragged to the ship.

A southwest wind had got up before we had finished, driving down the heavy ice upon the thinner bay ice, and crushing and piling it up in hummocks, making a roaring sound like an express train in motion, occasionally emitting a sound like a distant heavy gun, and now and then a shrill whistle.

The solid nickel government bullets are very useful if fired into a walrus's head, smashing the bones to pulp, but not giving sufficient shock to be effective if only coming in contact with muscle; but the Lee-Metford rifle with "soft-nosed" bullets are very destructive in their effect.

I came upon a walrus making a blow-hole with its tusks from beneath the ice to-day. The latter was about five inches thick, and the walrus was lying on its back, scraping and hammering at the ice above it and gradually enlarging the twelve-inch hole it had made. When of sufficient dimensions it would clamber through on to the surface.

Weather: Calm till 6 A.M. Light southwest winds and airs till 6 P.M. Then gentle to moderate south wind till midnight.

Fine clear weather till 6 P.M. Then overcast, and five hours' fine snow.

October 31st, Wednesday.—Just after breakfast Heyward came rushing into the cabin, saying: "Some one is shouting on shore like anything." I hurried on my "finsko" without waiting to secure them, having sent Heyward up the mizen-rigging to tell me if he could see anything. He returned, saying that the carpenter and others were on the top of the log-hut shouting. I ran off with my .303 rifle, meeting one of my men on the top of the cliff, whom I had sent on shore to get a few articles from one of

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the huts, in a state of considerable trepidation, and just behind came Petersen and the carpenter with hatchets in their hands. At the same time I saw a bear on the floe below me, having wandered down from the huts. I succeeded in shooting him when near the stern of the ship. He was a young he-bear, and showed unusual boldness, quite disregarding the presence of the whole crew, whom the excitement had called out; he was marching about helping himself to anything he fancied, and had quite taken charge of affairs in his immediate neighborhood.

My man tells me that after leaving the hut, in the rather dim light, he, when close to the entrance of the log-house, walked up to within a distance of ten or fifteen yards of the bear before he saw it. He turned and fled, shouting for assistance, and the bear gave chase. After taking the direction of the ship, and seeing that he would be overtaken, he succeeded in doubling back and reaching the log-hut, with the bear close at his heels. The men inside watched the bear through the windows until he walked away, and then went outside and climbed on to the roof and yelled to stop others from coming in that direction.

I went out in the morning to try and recover the walrus which we had left the previous evening with a harpoon and line made fast to it, taking Armitage, the doctor, Crowther, and three of the crew with me. Crowther I find to be a capital man, always active, willing, and obliging. He sets, too, a good example to the crew, and does his best to keep them contented and happy. On arriving on the spot we found that the ice had shifted about four hundred yards or more towards the north (Miers Channel), and was much crushed and hummocked. The line and boat-hook had disappeared with the walrus which had gone to the bottom when the ice crushed over it. We collected a quantity of frozen blood from the ice, to be used in our soup, which Dunsford and I fetched in the afternoon on a sledge.

Weather: Light to fresh S.E. wind and overcast generally. Eight and a half hours of fine snow.

November 1st, Thursday.—Little differences between officers and crew are always liable to occur, especially in situations such as ours. To-day a little hitch of this kind came to my ears; and thinking it better to check in the bud anything of the kind, I had

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the crew down aft and addressed a few words to them, saying that I had found the majority capital fellows, that I should not allow the very small minority to contaminate the others, and I intend to stand no nonsense; that I will make them as comfortable as I can, and if they have any complaints, to make them to me. At my request certain clauses of the ship's articles were read to them. That little difficulty being settled, everything was pleasant again. Poor chaps, they are not at all in love with the life here, and a little awkwardness sometimes is hardly surprising.

November 2d, Friday.—We did odd jobs at the huts. I decided out of compliment to Mr. Harmsworth to name our little settlement "Elmwood." Strong to light E.N.E. winds, and then light to moderate northeast winds. Overcast and hazy till 8 A.M., with two hours' snow; and then clear for the rest of the day. At 7.30 P.M. overcast, aurora E.N.E. 10° to 30° altitude. Another band above, and underneath it, extended to the west, altitude 20° . First band had numerous streamers.

November 3d, Saturday.—Blowing from northeast. The ice to the south is driven from the land floe inside of the bergs, and the water now reaches to within three hundred yards of the ship, and extends west to Bell and Mabel Islands and east in the direction of Cape Barents. This was caused by the southerly winds forcing in heavy ice on to the weaker bay ice, followed by a swell from the south, and then the northeast winds blew the detached ice off the land. There is more water visible now than there has been for weeks. I put the aluminium collapsible boat and sledges in the stable store, and buried all the other boats in the snow.

The cabin stove has been smoking villanously all along, and for the last few days the place has been full of smoke, in spite of its being cleaned out and everything that could be thought of done to prevent it. We shall be very glad to get ashore into the hut, as our quarters here are daily becoming more uncomfortable, the ice is accumulating everywhere, and everything freezes a few feet from the stove. The cabin door is coated with ice only a foot or two off the fire.

The crew are going on excellently, and doing their work cheerfully and willingly.

November 4th, Sunday.—The floe is still further broken away, and I am beginning to have apprehensions of its going away altogether, taking the ship with it, but I think the grounded berg

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near the ship will hold it unless it is much eaten away by the action of the water underneath.

We took a number of things ashore and began to fit up the interior of the hut. It is beginning to look quite nice; the green felt with which it is lined much increases the warmth and improves its appearance. We are doing our best to make it as comfortable as possible under the conditions, for it will be our headquarters for a long time to come.

The welfare of an expedition depends largely upon the discipline, comfort, and absence of degeneration of its members, and I consider it to be the first duty of a leader to see that his comrades are as well cared for, as comfortable as possible, and live in as civilized a manner as circumstances will permit. Without this the *morale* of a party cannot be kept up.

I dug the bark canoe out of the snow and put it in the stable, as I fear the weight of the snow in the drift may crush or damage it.

November 6th, Tuesday.—Four walruses were discovered lying on the edge of the floe. I shot two, but one sank before it could be secured, the other we cut up into joints. We took more stores out of the lazarette and sledged them up to the hut.

When returning to ship with Armitage at 7 P.M. we were met by several members of the expedition (one of them with my .303 rifle) coming to our possible rescue, as a bear had been seen a minute or two previously prowling between the ship and the hut. Two of the men and I then started off to look for him. It was very dark owing to there being no moon, and overcast and misty, but after looking about for some time I espied a yellowish object standing by the entrails of the walrus I had shot in the morning, and a warning hissing snarl told me what it was, and to look out for squalls. I went up to within fifteen yards and fired, a loud roar telling me that the shot had hit him. This was followed by a splash in the water as he broke through the bay ice. Owing to the darkness we were unable to see what then became of him.

Weather: Light to fresh N.W. wind, shifting to W. at 11 P.M. Overcast from 6 A.M. throughout the day.

November 9th, Friday.—Temperature: 26 F. below zero with a light breeze. Armitage and another shot a young she-bear to-

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day ; it left the floe and took to the water on being pursued, and was shot there. We ran down the twelve-foot Norwegian boat, and getting into it I put off in the darkness to secure the bear. The bay ice in the sea rendered navigation troublesome, so I had a long line attached to the little boat in case I got into trouble. After some difficulty I managed to secure the bear just as the ice closed in, and I was hauled on to the floe out of harm's way.

November 10th, Saturday.—I got up with a bad attack of migraine headache and could eat no breakfast, which is a very unusual thing for me, and was lying upon my bunk when the report of a bear being near the ship roused me up. I started off with my .303 rifle, having quite forgotten my headache. The numbers that followed me, however, scared him off. I returned to the ship and had fat put in the galley and cabin fires, to try and draw him up, as he was still in sight to leeward. While so engaged Petersen appeared on the cliff shouting and gesticulating, and as I surmised that there was another bear near the hut where the carpenter and some men were at work, and that they might be in difficulties there, I started off, leaving Armitage to conduct operations against bear number one. On reaching the plateau I saw the new-comer—for it proved to be a bear—on the fresh-water pond near the hut, and just then the carpenter fired at him but missed, and he ran off down the steep slope on to the floe, down which I glissaded after him and managed after some manœuvring to approach within seven yards of him and finished him with one shot behind the left ear. Seeing several people starting off in pursuit of bear number one, I ran across the floe to head him off, but he took to some thin ice and his pursuers from the ship fell behind. I followed him for about three miles farther over the old floe and bay ice, when eventually he took to the water and disappeared without my getting a shot. When returning I unfortunately broke the stock of my rifle. I have set Child and the first engineer to repair it, as they are capital hands at any work of this kind and are clever with their fingers.

The bear I killed had only grass in its stomach, which Fisher tells me is of a non-nourishing character. Bears evidently can go for a very long time without food by drawing on their fat, fasting being followed, when they kill a seal, by a gorge which again lasts them for some time. We have sometimes found them after such a meal blown out to such an extent as to resemble a

WINTER DARKNESS—DREARY DAYS

balloon. Grass is probably swallowed as a stop-gap, "to fill an aching void" in the stomach.

November 11th, Sunday.—Blowing a strong gale from E.N.E. with a temperature varying from 28° F. to 35° F. below zero. Bitterly cold, and troublesome to be out owing to frost-bites being so frequent. The temperature in the berths is 5° F. below zero—rather a cool temperature for a bedroom!

I went across to the huts several times to-day, and was engaged in getting some clothing for the boatswain from No. 1 canvas hut about 5 P.M.; Maxim, the Russian carpenter, was holding the door to prevent the wind getting inside and carrying the light hut away, when he suddenly yelled and rushed away, letting the door fly open. I at once suspected that the proximity of a bear was the cause of his trepidation, so I came out, made the door fast, and proceeded to investigate matters. I had hardly gone five paces from the hut when, in turning the corner of No. 2 hut, I came face to face at three yards distant with a large bear. As I was unarmed I retraced my steps and made for the log-hut, where I had my rifle. Maxim, by-the-bye, had clambered on to the top of the stable, where he was yelling lustily for me. I had unfortunately got both hands frozen, and I had to delay for nearly two minutes while one of my men, whom I found in the hut, rubbed them, before I could handle my rifle. I then started out to find that Child and Allan had arrived on the scene from the ship, which the bear had previously visited, and had fired two shots at it, but without hitting it, as it stood on its hind legs trying to reach Maxim on the top of the stable. The bear was then retreating towards the floe. I gave chase, glissading down the steep slope and pursued him across the ice, where Armitage and young Heyward joined me and fired three distant shots at him. They fell behind in the chase, but I managed to head the bear near the two bergs to the southeast of the ship, he going round them one way and I meeting him face to face by going round them the other. I fired when he was about fifteen paces off, and he fell, but struggled to his legs again and shambling off. Frozen hands and the darkness, although the moon was shining brightly, prevented my getting a cartridge into my rifle sufficiently quick to stop him. He then took to the old floe and I lost sight of him, but followed him among the high hummocks by his blood and tracks, and at last suddenly coming upon him

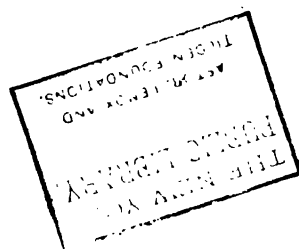
A THOUSAND DAYS IN THE ARCTIC

at a distance of three yards, I put a second bullet into his neck, and he managed again to scramble a few yards, and then stood snarling and snapping and making short rushes at a dog which had joined me. I gave him one more shot, which straightened him out. Armitage then rejoined me, and we set to work under the lee of a berg to rub our frost-bitten noses and chins, as the temperature was standing at 38° F. below zero, with a gale of wind blowing. I then returned to the ship, turned out all the land



BRINGING BACK THE BEAR

party, and called for volunteers from the crew, as the weather was so bad and it was Sunday, and started off with a sledge to fetch the bear in. We were all muffled up, leaving only the eyes showing, so as to avoid as much as possible getting frost-bitten, and I utilized a cloth gun-case to wrap round my face for this purpose. We got him to the ship without mishap. He turned out to be a fine full-grown he-bear. He gave me fine sport. "Bear" was the sole topic of conversation for the rest of the evening, and the various adventures of Maxim, myself, and so on. The former, on my return to the log-hut later on, I found rather pale and excited, and he explained in Russian that the bear had come up within "three arsheen" (about three yards) of him when outside the hut holding the door for me. He had





OFFICERS OF S. V. *IZVODNO*, 1394 TO 1895



THE DEAD BEAR

WINTER DARKNESS—DREARY DAYS

to run for it, and by dodging round it got away from the bear and clambered up the ladder to the roof of the log-stable, where I soon heard him.

Weather: Moderate to fresh gale from E.N.E., decreasing to fresh breeze at 8 P.M., and shifting to N.E. at midnight. Sky clear, gusts of force from 7 to 8 till 6 P.M. Temperature from 28° to 38° F. below zero. At 7 P.M. brilliant aurora from E. to W., breaking into various shapes, shooting out flames of pale green banded with red. Disappeared at 7.15 P.M.

November 12th, Monday.—Three more bears put in an appearance at the log-hut to-day, one of which rubbed its nose against the window-glass—so Maxim says—and peeped in, while he was looking out to see what the dogs were barking at, causing him considerable alarm. The other two were scared away before I could arrive on the spot, and although I searched for them all over the floes with the dogs, I could see nothing of them. The increase in the number of bears seen now is due probably to the southwest and southeast winds having brought in the ice on which they were towards the land. It is quite possible that they come to Cape Flora to get grass or sedge, as it is one of the very few spots where any grow in this part of the world.

Did odd jobs at the hut to-day.

The skipper is again in bed. His health is anything but good.

Some of the party left their bunks and slept in the cabin—on the table, or on boxes, etc., as the cold in their cabin is too much for them. It is 35° F. below zero at the hut and a strong gale blowing. The temperature in the cabins has been considerably below zero.

The cabin door eighteen inches from the stove is coated with ice, and so are most things a short distance away from the fire.

Weather: Fresh to moderate N.E. wind, decreasing to calm at 8 P.M. At midnight S.E. airs. Fine, clear weather throughout. No aurora.

November 13th, Tuesday.—At 4.30 A.M. Crowther, who had happened to come up on deck, came down and woke me, saying a bear was near the ship. I tumbled out of my bunk, putting a coat, waistcoat, and trousers over my pajamas and a pair of "finsko" on my feet. It was brilliant moonlight and quite calm, and I could see the bear at some distance off, with five or six dogs yap-

A THOUSAND DAYS IN THE ARCTIC

ping round him. I ran between him and the bay ice, towards which he was retreating, and so headed him. He came at me at a good fast trot, and when at six paces off I fired and he fell dead. The bullet entered his neck and penetrated to the right lung, where it was afterwards found. I then went up to the hut and fetched Maxim, and he, Crowther, the watchman Mouat, and I dragged him on a sledge to the ship. He was an unusually large he-bear. He had every intention of "going for" me when I shot him, and I stopped him just in time. His stomach and intestines were quite empty, so he was evidently very hungry. I endeavor to trace the course of all bullets, and to recover them when possible, to ascertain the exact amount of injury caused by each particular bullet, so as to get an idea as to which is the most effective. In this the doctor is very good in helping me, and frequently spends hours in tracing them.

We did odd jobs at the hut to-day.

Temperature rose from 30° F. below zero to 16° F. below later in the day.

November 14th, Wednesday.—I shot a bear at 9 P.M. on the floe. It was bright moonlight at the time, and several dogs were barking around him. He showed a disposition to clear out, so I lay down on the ice and imitated the movements of a seal, quite taking him in, for he at once came running towards me, and when at ten paces off I fired, finishing him in two shots with my .450 Express rifle.

It was curious to see the look of doubt and misgiving that came into his face as he approached me. On nearer inspection, evidently thinking me the oddest seal he had ever seen, he began to think better of it, and when I fired was on the point of reversing.

November 15th, Thursday.—The doctor and I ate a little fried bear's liver for breakfast; the others did not fancy it. This has been held by many Arctic explorers to have poisonous qualities, and he and I desired to test it. We ate about a quarter of a pound each, and although I suffered from a bad attack of headache six hours after, I am not quite sure that the liver produced this unpleasant effect upon me, but intend to further test it.

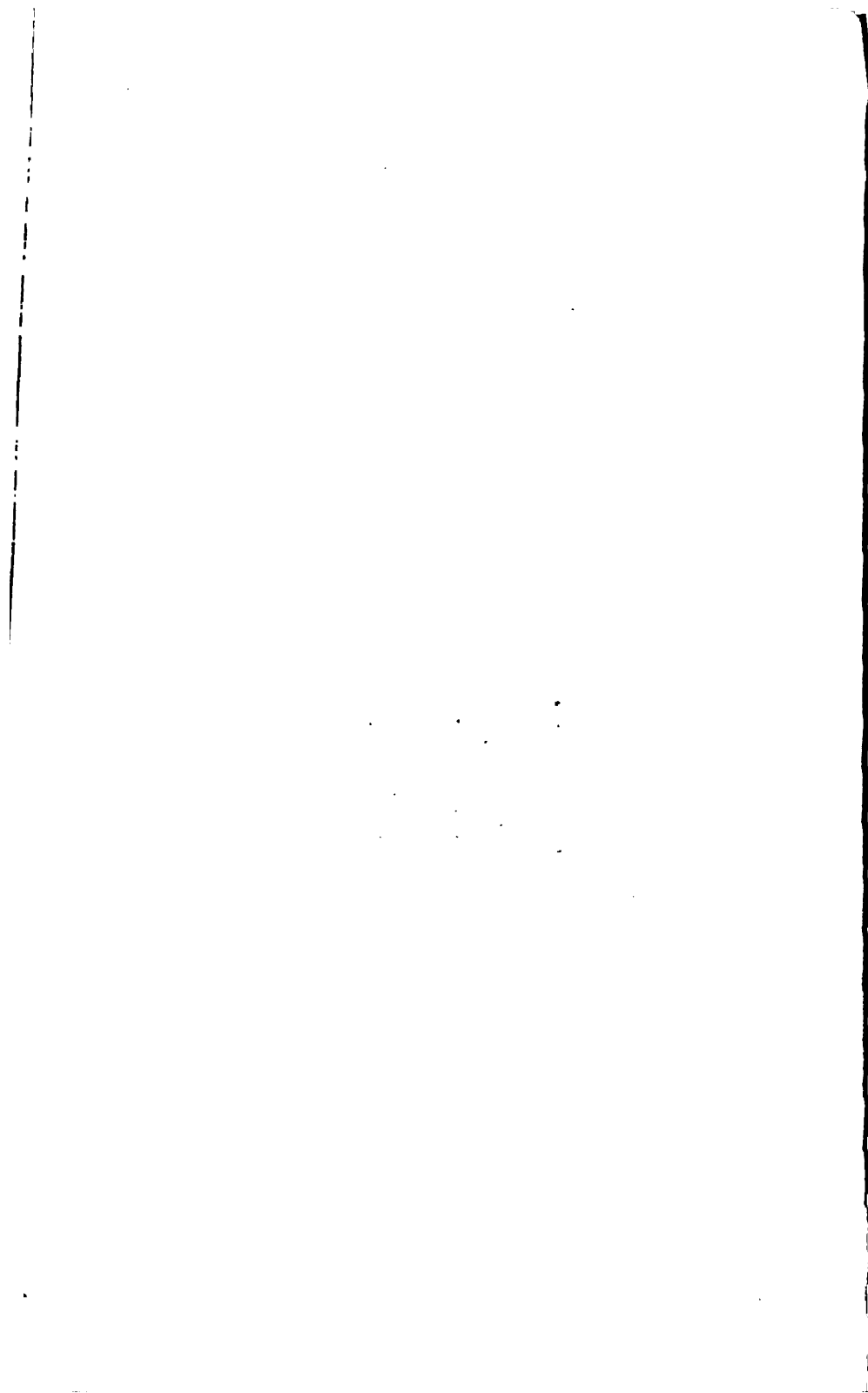
The doctor has headache also. It may be the liver that is troubling both of us.

I spent most of the day writing. A great rise in temperature



THE INTERIOR OF OUR HUT

Taken by candle-light. Five hours' exposure



WINTER DARKNESS—DREARY DAYS

to $+15^{\circ}$ F. (a rise of 54° since the 12th). The cabin and bunks are dripping with water.

Weather: A.M., light S. wind. From noon to midnight, light to strong N.W. wind. Overcast throughout. Twelve hours' fine snow. Very dark all day, and could only see a very short distance. Temperature, 7° F. to 15° F.

November 17th, Saturday.—Cloudy, snowing, and very dark all day. Mid-day indistinguishable from midnight, which has been the case for the last week or ten days. We have all been very busy to-day completing our preparations for moving into the hut. After dining on board the *Windward* and drinking to her luck, we adjourned to the hut and had a glass of port each there, and smoked some of our small stock of cigars. I proposed as a toast—"Good luck to 'Elmwood,' and may we all be very happy here and never leave it except to return to England *after* finishing our work here." The musical box was carried up to-night, and much to our amusement the jar caused by its being set down started it playing the moment it was brought into the hut. It did not play "There is no luck about the house," so we may take it as a good omen, if any of us believe in such things. We all slept at the hut to-night, using the reindeer bags as mattresses, placed on the floor with blanket-bags to sleep in.

Weather: Fresh, decreasing S.E. wind at 2 A.M. Shifted to E.S.E. at noon. Calm at 4 P.M. Light E.N.E. airs at 8 P.M. Calm at 10 P.M. Overcast throughout. Twelve hours' snow.

November 18th, Sunday.—I had a cold bath this morning, which was a great luxury after the deprivation on board the *Windward* of this necessary adjunct of the toilet for the last few weeks. We have arranged a bath-room in our only living-room with canvas screens dropped from the ceiling, which are rolled up when not in use. All water used has to be melted from snow. This prevents our having more than one bath in a morning, but each man has one once a week. Our actual living space is about 13 by 12 feet, in which eight of us live, sleep, and do our work. The space is rather limited, but we are happy enough. Our bath-room on the ship, which also did service as a scullery, had long since become unusable, and the close quarters there and overcrowding had not been conducive to cleanliness. We

A THOUSAND DAYS IN THE ARCTIC

went on board for meals, as the little kitchen here is being used as a carpenter's workshop. Ours is without doubt the most suitable, best, and most comfortable house ever put up in this latitude, and I am thoroughly satisfied with it and the arrangements we have made in it. My journey through northern Russia in 1893 would have been quite repaid alone by enabling me to hit upon such a suitable Arctic habitation as this.

I sent the following notice to the forecabin, as I think it will tend to get the men out more, and also will secure us more bears than we should otherwise get. I think that even now we have sufficient fresh meat to give the expedition one meal of fresh meat every day and the crew four times a week. This, if the crew can be induced to take sufficient exercise, will keep us all from scurvy, I hope. Doubtless, too, I shall get more meat shortly, so that little tinned need be used.

"Notice"

"In the event of a bear being seen, information should be *immediately given* to me, either by night or by day. Should I be able to fire a shot at it, *2s. 6d.* (two shillings and sixpence) reward will be given for each bear on arrival in London to the person who first brought the information. The same reward will be paid for walrus on the ice or for foxes.

"A written order will be given by me for the payment of the rewards.

FREDERICK G. JACKSON.

"N.B.—A rifle will be kept in the cabin for the protection of persons against bears while carrying the information to 'Elmwood.'

"November 18, 1894."

Weather: Light N.N.W. wind at noon, veering to N. at 4 P.M., and increasing to moderate breeze and decreasing to calm at midnight. Cloudy and overcast in the early part of the day, clearing in the afternoon and quite cloudless at midnight. At 6 P.M. observed a brilliant aurora, similar, in most respects, to that of the 11th and 14th, but with not quite so much color, but larger, from N.E. to S.W., moving in a circle around the heavens against the direction of the hands of a watch, at an altitude of 70°. Quite disappeared twice, and again appeared at the same place and shape. Had a double corona,* one to N.W. and one to S.E.

* By a corona I mean that the streamers formed a shape at the zenith resembling a crown.



A CORNER OF MY CABIN

WINTER DARKNESS—DREARY DAYS

November 19th, Monday.—Put up a weather-board box 6 ft. 6 in. high, 4 ft. 3 in. long by 4 ft. wide, for the George's barometer and the Meteorological Office aneroid. Did odd jobs in the hut. No bears seen since our last kill. Our house is without doubt the most comfortable ever put up in these latitudes, and inside has quite a cosy and even a pretty appearance. The walls are covered with green felt, the floor with sheets of brown paper, with a patterned felt over it, and the ceiling with the latter felt, but with the reverse, or gray, side exposed to view. It is well ventilated by means of two apertures—one perforated five-inch aperture three feet from the ground (thirteen $\frac{3}{4}$ -inch holes) on the southern wall of the house, and capable of being closed with a plug of wood. The other ventilating hole is four and a half inches in diameter, and is in the roof near the stove, and can also be closed with a plug when necessary.

The photo of Mr. and Mrs. Harmsworth, draped with jacks, and also those of the Queen, Prince, and Princess of Wales, also draped with union-jacks, adorn our walls, added to which are etchings, some signed by Frank Payton, kindly given to me by Mrs. Harmsworth. They are entitled "Not at Home," "In it," "The Sheik's Daughter," "Notice to Quit."

I have a small cabin 7 ft. 11 in. by 4 ft. 10 $\frac{1}{2}$ in. which I use as a receptacle for my property and to sleep in. My friends' photos adorn the walls of my "room," and I sleep on the floor, using, like the rest of the expedition, my sleeping-bag as a mattress, and rolling it up during the day, thus giving more room than a fixed bunk would.

The doctor and Armitage together occupy a similar cabin on the same side of the hut.

The rest of the expedition sleep on the floor of the living-room, using as mattresses their sleeping-bags, which during the day are rolled up and stowed away on a rack on the ceiling near the entrance. The hut is only 7 ft. high. As the doctor is 6 ft. 1 $\frac{1}{2}$ in., and I and one or two others are about 6 ft., it doesn't give us too much room above our heads when racks are fixed to the ceiling. The personal property of the expedition is stowed away on shelves, which together with book-shelves occupy every available space on the walls. We have a small library of books, kindly presented to the expedition by Mr. Marston, but we are very short of Arctic literature. At present we are using one small

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slow-combustion stove 2 ft. 2 in. by 1 ft. 1 in., which we find quite sufficient for heating the hut, but I have piping for an ordinary stove to go alongside it, of rather smaller dimensions, in case at any time we require extra heat. In the corner next the store-room, which is about seven feet by five, I have placed a covered cask 4 ft. 6 in. by 33 in. with a cock, into which snow is daily put and is melted by the warmth of the room. One member of the expedition has a bath each morning; our bath-room, being two canvas screens which can be dropped from the ceiling and rolled up and tied in position when not in use, answers admirably. No hot baths are allowed, as these would cause too much moisture. My own guns stand in a rack in my cabin, and the expedition guns in a rack in the living-room.

November 20th, Wednesday.—We have been very busy to-day removing the table from the cabin on the ship to the hut, as this is necessary, I find, and in carrying goods up.

We had our first meal at our new quarters to-day—dinner at 7.30 P.M., accompanied by a bottle and a half of sherry among us in honor of the event. I proposed as a toast "The healths of Mr. and Mrs. Harmsworth and all our friends," which was enthusiastically honored. Our chairs chiefly consist of packing-cases turned up on end and a stool or two.

Our cook gave us an excellent dinner, and quite changed the character of our bear's-meat fare. I now feel easy about the winter so far as fresh meat is concerned, having killed and committed to the larder fifteen bears and seven walruses up to date (in two and a half months). We shall doubtless get more bears yet. I have, too, all the blood kept that can be saved.

Weather: A gentle wind, decreasing to calm at 10 A.M. Light E. airs at noon, rapidly increasing in force and shifting to N. at 2.30 P.M., and blew a fresh gale at 6 P.M. It began to decrease at 9 P.M., and rapidly decreased to calm at 2 A.M. of the 22d. Overcast through out till 11 P.M. Snowing hard at times and driving fiercely during the gale. Quite clear at midnight. Drifts from two to seven feet high.

November 23d, Friday.—Snowing, with a high southeast wind, all day. Snow drifting. Another rise in temperature.

Did odd jobs; cleaned my guns and fixed up the expedition gun-rack. At 9.30 P.M. some of us went for a walk as far as

WINTER DARKNESS—DREARY DAYS

Sharpe's Rock. Still snowing, and driving hard in our faces. We returned at 11.30 P.M.

Weather: At 10 A.M. moderate E.N.E. gale, unsteady, shifting round to E. and back again. Moderated to strong wind and shifted to S.E. at 10 P.M. Overcast and snowing hard throughout. Snow driving furiously before the wind.

November 24th, Saturday.—Have been engaged with four members of the expedition in digging out the horse-sledges from the snow and making roads through the drifts around the house. Some of my men and seven of the dogs accompanied me for a walk after dinner. Went nearly as far as the glacier. Snow drifting before the wind and thick mist made it difficult to pick one's way.

I started two-hourly watches for observations of instruments, which are continued through the night. I take from midnight to 2 A.M., the doctor from 2 A.M. till 4 A.M., Child from 4 A.M. till 6 A.M., Burgess from 6 A.M. till 8 A.M., when Armitage comes on. The first three of us change watches with each other every night. We take it in alphabetical order to sweep the house out every morning and to do housemaid's work generally.

Weather: Light to moderate E. and E.S.E. winds throughout the day. Overcast throughout. Fine snow fell for eight hours. At 8.10 P.M. a sharp shower of rain fell of three minutes' duration. At 8.20 fine snow falling, the wind warm and soft, with a very remarkable rise of temperature.

CHAPTER IV

OUR ARCTIC HUT

November 26, 1894, Monday.—We did odd jobs about the hut and stable. Child, who has charge of the lamps, tells me that we burn three and a half pints of paraffin in the twenty-four hours—ten lamps being either occasionally or constantly burning. Three from 8 A.M. to midnight. One all night for those on watch. The rest are only lighted occasionally—the hurricane-lamps, for example, for going to the stores, and for Maxim's use in the stable. No bears have been seen since the 14th. We shall see more doubtless when the moon returns.

Weather: Wind varying from light airs to moderate breeze. Chiefly from E. and E.N.E. Overcast, cloudy weather generally. Two and a half hours' fine snow.

November 28th, Wednesday.—At 11.30 A.M. we all went out to the gully ski-ing, and continued our exercise till 2 P.M. One or two of us succeeded in running the full length of the gully over the slope on to the floe without a fall, which in the darkness and with stones in the way and sheets of icy snow at intervals gives lots of fun and some bruises.

Weather: Wind varying in force between light and fresh from E. and E.N.E. Fine clear weather generally. Red glow of dawn at noon on southern horizon, but a very faint twilight indeed for a few minutes.

November 29th, Thursday.—We did odd jobs about the place, and after lunch at 1 P.M. the members of the expedition went to Ski Gully with shovels and picks to loosen the icy snow and to try and remove the bowlders on the slope. I fear our ski-run would not be thought much of in Norway, as the gales blow all the snow off the slope from the talus of the rocks, and from the plateau, and cut into deep rifts the hard snow in the gullies, but

OUR ARCTIC HUT

it is the best we have. I sent a letter of invitation to the skipper, the two mates, the ice-master, the two engineers, and the carpenter to come to the hut to-morrow night for a concert and supper at 8 P.M.

Weather: Wind calm to strong from E. and E.N.E. Overcast and cloudy weather generally. Two hours' fine snow, and the snow driving during the latter part of the day.

November 30th, Friday.—The ship's officers put in an appearance at 8 P.M. exactly, carefully rigged up in their best clothes. The evening was passed in smoking, singing, and the consumption of sundry whiskeys—for this counted as a gala-day, otherwise we only have one nip each on Saturday night—and finishing up with a light stand-up supper. The visitors proposed my health and wished good luck to our undertaking. The evening passed very pleasantly.

Weather: At 2 A.M. moderate decreasing E. gale, shifting to N.W., with light airs at 4 P.M. and again shifting to E. at 8 P.M. Snow driving furiously during the early part of the day. Gusty towards midnight. At 4 P.M. two auroral streamers to N.W. At 7 P.M. auroral band from E. over zenith to W. At 8.30 P.M. the same, both moving rapidly to W.

December 1st, Saturday.—Temperature to-day from 17° F. to 20° F. below zero, being colder than for some time past.

Although we are all as jolly and as happy as sand-boys, I think the perpetual darkness and consequent reduction in the amount of exercise and the deadly monotony have their effect upon us. Appetites have fallen off lately very much I notice, and the men are paler than they were.

Weather: Varying force of wind. Light airs to strong breeze from E. to E.N.E. Fine clear weather throughout. At 10 A.M. a few auroral streamers from N.E. to W.

December 2d, Sunday.—We walked to the east as far as the Castle Rock in the afternoon, being out from three till six. And again in the evening we walked from 8.30 till 11.15 P.M. Much warmer to-day, the weather being calm and the thermometer ranging from 13° F. to 20° F. below zero.

The moon, which we shall get back in two days, appears even now to have its effect in making it less dark if the sky is clear. A

A THOUSAND DAYS IN THE ARCTIC

slight orange tint is still noticeable on the southern sky at mid-day, indicating the whereabouts of the direction of the sun.

Weather: Calms and light airs from N. and N.W. Fine clear weather throughout. At noon three auroral streamers extending to an altitude of 38° to N.W. A faint red glow to S., but a very faint twilight.

December 3d, Monday.—My right arm, which has been painful ever since the second week in September, when I ruptured some fibres of one of the muscles in lifting packing-cases of goods, during the last few days has been especially so. The doctor, who has tried several remedies ineffectually, has now bandaged the whole forearm to above the elbow with a broad elastic bandage to see if pressure will cure it.

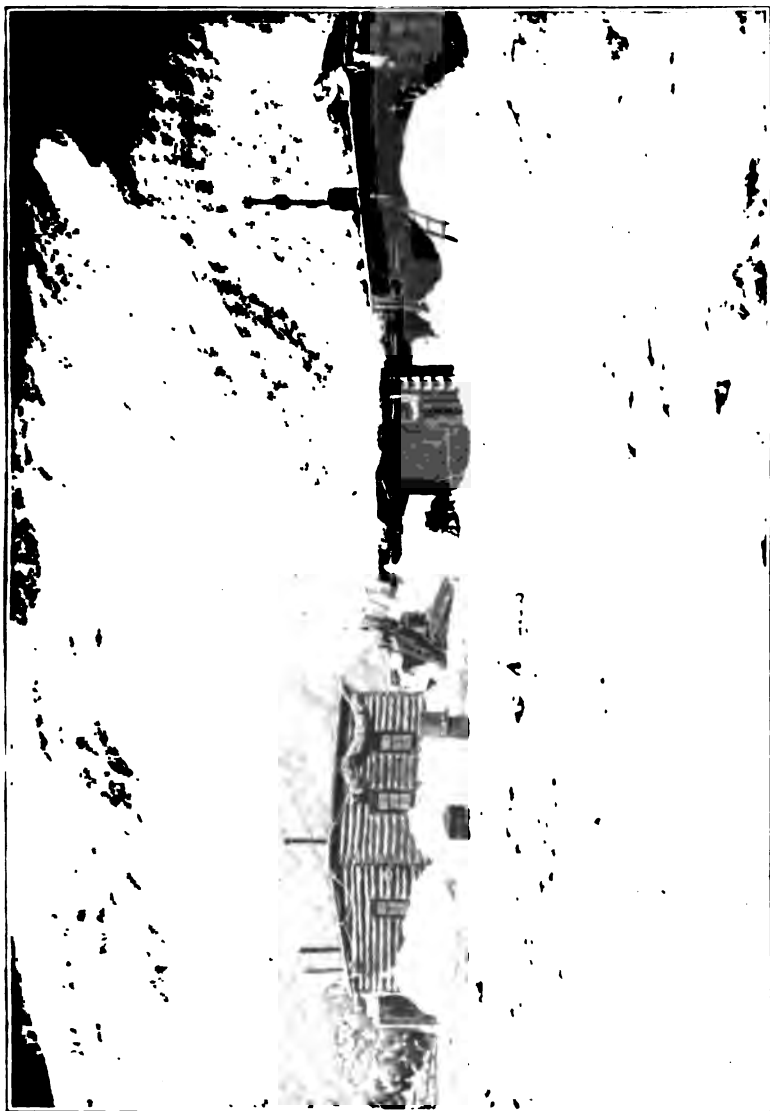
December 4th, Tuesday.—The after-galley, which the carpenter has been at work at, altering it into an observatory, was sledged up from the ship to-day, all hands being engaged at it. It will answer very well when the iron nails in it are replaced by copper. This is necessary, as we shall use it for magnetic observations. Iron nails would affect the needle.

The moon is due back to-morrow. We are all looking forward to it immensely. There is a very faint twilight for a few minutes at noon each day when the sky is quite clear, and a faint orange tint to the south. But mid-day and midnight have practically nothing to distinguish them, so far as light is concerned, even on clear days or nights, and when the sky is overcast, as is usually the case, there is nothing whatever.

Weather: At 2 A.M. strong N. wind, decreasing and shifting to light W. wind at 6 A.M. From 8 A.M. till 8 P.M. gentle to light N.W. wind, and then calm till midnight. Fine clear weather throughout. Very gusty at times in early morning.

December 5th, Wednesday.—The moon put in an appearance in the first quarter for an hour or two to-day. The minimum thermometer shows 42° below zero. There is no wind this evening, so it is not tryingly cool. The bay floe in which the ship is lying showed to-day by measurement three feet nine inches in thickness.

Weather: At 2 A.M. gentle N. wind. At 4 A.M. fresh N.E. wind. At 6 A.M. fresh decreasing E. gale. At 10 A.M. strong decreasing N.E. wind.



OUR HUT BY MOONLIGHT IN WINTER

OUR ARCTIC HUT

From 6 P.M. till midnight calm. Fine clear weather throughout. At 10.5 P.M. brilliant aurora, beginning in long streamers from E. through S. to W. Coming to apex at 10° below the polar-star at 10.15 P.M., with a long ridge of thicker light at 5° above horizon, spreading out like a fan. Some parts of the band thicker than others, and separated into circles. At 10.25 P.M. a fringe of streamers changed from pale green to prismatic colors of rose, brick-red, and bright green, and moved rapidly laterally to E. with shimmering appearance.

December 6th, Thursday.—We went out for a walk twice to-day accompanied by the dogs. Very blowy, with heavy gusts, driving hard shotty snow before it, which cut our faces, making it very unpleasant. Temperature 22° F. below zero.

Weather : At 2 A.M. gentle E. wind shifting to W.N.W. and N.W., and increasing to a strong wind. At 10 A.M. fresh N.E. wind, shifting to moderate increasing W.N.W. wind at 4 P.M. At 6 P.M. a gentle N. wind. At 8 P.M. N.W. At midnight a gentle increasing N. wind. Sky clear. Gusts at force 7 to 9 from 10 A.M. till midnight. Snow driving fiercely.

December 7th, Friday.—Blowing very hard all night till 9 A.M., with very fierce gusts and driving snow, very hard in consistence. About this time it slackened off to a calm.

After lunch all the party accompanied me with their ski to try Ski Gully, but we found that the gale had quite spoiled it, having blown away all the loose snow, and even had cut hard compact snow into gullies and ridges. We tried it for a time, but found it too unsatisfactory to be worth continuing, as our progress down the slope became a series of tumbles as we bounced from ridge to ridge on our ski in the darkness. The prone position reached by a resounding fall became a trifle monotonous after a time. We took our ski off, as the whole of the plateau at the foot of the talus is again swept clean of snow, and went for a walk to beyond Sharpe's Rock. It was moonlight, calm and pleasant, and the thermometer stood at 20° F. below zero.

Weather : At 2 A.M. strong N.E. gale. At 4 A.M. a whole N.W. gale, gusts at force 11 at times. At 1 A.M. a fresh gale at N.N.E. decreasing. At 10 A.M. moderate N.E. wind. From noon till midnight light variable airs and calms. Fine and clear overhead. At 6 P.M. clouds passing rapidly from N.W. At 10 P.M. a large semicircular halo around moon with a radius of 14° . Pale-green band of aurora shot rapidly across the sky from E. over zenith to W. at 10.15 P.M.

A THOUSAND DAYS IN THE ARCTIC

December 8th, Saturday.—The mate came up to ask if I can let them have a little paraffin, as they have run out at the ship. I gave him ten gallons to go on with.

Banked up the east and northeast side of the house with snow, as it is cold on that side, and ice is collecting on the felt on the wall on that side of the room.

We went for a walk over the floe as far as the two bergs at "Bear Corner." I named these two bergs "Bear Corner" owing to this spot having been the scene of many good bear-hunts. The old floe to the east, consisting of heavy hummocky ice, is fringed at the edge by a high-pressure ridge which runs for half a mile or so bordering it, outside of which is a narrow expanse of fairly level ice, giving the appearance in the moonlight of a covert side enclosed by a hedge, high fantastic hummocks taking the place of trees and undergrowth, and the level ice outside the field adjoining the wood. It often recalls scenes of pheasant-shooting in November to me. Owing to the moon being quite clouded over, we had many falls over hummocks of ice. The doctor and I again went for a walk in the evening, starting at 10.15 P.M. and returned at midnight, going west till the snow coming on heavily we returned.

December 9th, Sunday.—Blowing with driving snow, and, owing to its being overcast, very dark. Cleared up towards night, and the doctor, Child, and Heyward accompanied me for a walk east. When crossing Ski Gully we found that the snow had drifted across it and that it was in good condition for ski-ing. We returned for our ski, and the doctor, Heyward, and I amused ourselves till midnight, running down the gully and over the slope on to the floe; the moon having now risen afforded a fair light.

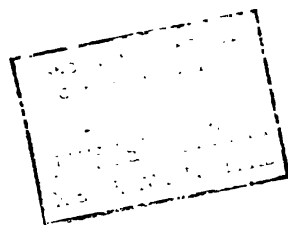
A temperature of 17° F. below zero and a stiff breeze with brilliant moonlight made it cool but pleasant. I could see open water about three miles to southwest of us, but none elsewhere.

December 11th, Tuesday.—Blowing very hard from the north. About 10.30 A.M. three boards from the roof of our hut were wrenched off and carried away, and in their flight through the air knocked off the range chimney-pipe and badly doubled up the one from our sitting-room stove.

These casualties were followed by the high flag-staff on the hut falling and smashing the east window, both inner and outer,



"BEAR CORNER"



OUR ARCTIC HUT

on its way down. Two of my men and I went up on to the roof and nailed down one or two other boards which had started, but we had to crawl along at full length to avoid being blown off, and as the thermometer ranged from seventeen to twenty-eight degrees below zero during the morning, it was cool work; we constantly got our faces and hands frozen during the operation. Dunsford and I afterwards carried the house refuse in a case to the edge of the cliffs, where we dumped it. While so engaged I left the sledge for about ten seconds, and on turning round found it had disappeared; the wind had carried it off, but where it had gone I had not the least idea. As I concluded that it had been blown over the high precipitous slope I glissaded down it on to the floe, but after a search of nearly an hour I could see no trace of the sledge. I, however, discovered later on that Dunsford had found it jammed against a rock at the edge of the cliffs quite uninjured. It was difficult to find it in the darkness and the high gale with driving snow.

The bitingly cold wind was driving hard shotty snow, and altogether it was one of the worst days I have known. I got frost-bitten as usual on my right cheek and chin, and Dunsford fared much worse. I sent an invitation to the crew to come here on Thursday evening at eight o'clock for a concert and supper. I am anxious to find amusement for them.

The doctor, who adds dentistry to his many accomplishments, stopped a tooth for me to-day.

December 12th, Wednesday.—An improvement in the weather. Bright moonlight and only a light breeze blowing till late in the afternoon.

I found that part of the roof of the dogs' house had been torn off by the gale, so I spent most of the morning searching in the darkness for the boarding that has been blown away. After lunch the doctor and I went for a walk south over the floe to the edge of the bay ice skirting the open water. The gales have driven the ice off the land floe to within two miles of the ship. I took my .303 rifle and the dogs with me in the hope of meeting with a bear. The carpenter is still working at the observatory, and is fitting up the interior.

I went to examine our ski-run, but found that the gale has spoiled it for the present. Every movable particle of snow is swept off the floes, and what remains is packed as hard as ice. I

A THOUSAND DAYS IN THE ARCTIC

find the slow-combustion stove burns forty-five pounds of coal in the twenty-four hours, keeping up a temperature of about 50° F. in the hut.

December 13th, Thursday.—Blowing hard, with drifting, driving snow as usual. This is the windiest spot I ever put foot upon! The moon was obscured by an overcast sky all day. I went for several constitutionals as usual in the course of the day, but owing to the bitterly cutting wind and driving, hard snow it was a mixed pleasure.

The crew turned up at 8 P.M. in spite of the weather, remaining until midnight, the evening being spent in singing and smoking, accompanied with whiskey toddy and a light supper.

We are all very well indeed, and I am congratulating myself on having been able to shoot sufficient fresh meat to supply our requirements for the winter. This I am confident is the great secret of keeping a party healthy, together with giving men plenty of work and walking exercise. We are always occupied and busy. I felt very uneasy until I had been successful as to our larder.

The darkness combined with the vile weather is trying, as we of necessity take our exercise like a dose of medicine, for plodding and tumbling about in the darkness is often the reverse of a pleasure, and falls over rocks and ice-hummocks are of too frequent occurrence to be altogether amusing. We are often very glad when we have taken our walk and can return to the hut.

December 14th, Friday.—To-day is much as yesterday so far as weather is concerned. We went for several walks as usual. No ski-running is possible, as the gales prevent the snow resting on the slopes.

Child is engaged in soldering up in a tin case the sixteen letters I have for Nansen and his party. This will protect them from damage and enable me to take them with me sledging, as there is a thousand-to-one chance that I may meet him or some of his party when we are away.

I have had a muzzle made for "Carlo," the retriever, which he generally prefers to wear cocked over his left eye, giving him a very Bill Sykes-like appearance. Otherwise whenever he has a chance he spends all his time fighting, and would soon kill every dog about the place if he were allowed to go about unrestrained. He is the only representative of the criminal classes here, and is the terror of the *Windward* people.

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December 17th, Monday.—I set Petersen to work to make the elkskin finsko smaller, as they are all too large. Skin stockings inside fur boots are too warm for *walking* in unless the temperature is very low, but they are useful for sleeping in when sledging. We took our usual walks. I sewed up a rent in the roof of No. 4 hut, torn by a flying fragment of wood during the high gale. A very cool job it was too in a gale of wind with the thermometer at thirty-two degrees below zero, especially as I could only use thin worsted gloves when using a needle and twine, and in the darkness it was a very tiresome one. I was afraid, however, of the wind getting fairly inside and carrying the whole hut away, so dare not postpone the operation. I had to run backward and forward into the hut frequently to thaw out my frozen fingers and warm them up before I could go on with my work.

Our dogs are a source of great amusement. I let loose from the dog-house three or four every other day, and the ones let go on the preceding day are tied up in their places. Thus all the dogs get a day's liberty frequently.

In addition to the dogs periodically free there are the three pups, the nine months' old dog "Yugor," which I bought at the Yugor Straits to give to Mrs. Harmsworth, and my bear dog, which are always loose and frequently in the house around the stove. I dare not let loose all the dogs at once, for when in numbers they have a very unpleasant habit of fixing on one unfortunate dog and murdering it. They killed one before I could get the dog-house built, and "Carlo" bagged one on his own account. They have been very well up to the present and free from disease. They do well on the Spratt's biscuit, which they have had almost exclusively for three months, but I shall give them a change to bear's-meat soon—when I have enough for ourselves and them too. The four ponies are exercised every day when the weather is not too bad. They look very well, and their coats are now very thick and long.

Weather: From 2 to 6 A.M. calm. At 8 A.M. gentle N.E. by N. wind. From 3 till midnight light winds from N., N.N.E., and N.W. Fine clear weather throughout. At 4 A.M. band (arches) of auroral light across heavens N.N.E. through zenith S.S.W.

At 8 P.M. a few auroral streamers in N. and N.W. At 2 P.M. auroral serpentine-shaped band E. through zenith to W. At 4 P.M. E. to S.W. at altitude 10°.

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Throughout day, since 2 A.M., constant auroral bands and streamers E. to S.W. and W. Bands similar to that of 4 P.M. At midnight a similar display to that of 16th at midnight.

December 18th, Tuesday.—We took our usual walks and did various odd jobs about the place. The moon is fast declining. It has been of little service to us this time, owing to the overcast weather. It has been impossible to take observations with the theodolite for our exact latitude and longitude since the observatory was fixed up, owing to the gales and overcast weather. Armitage and I tried to-day during a break in the clouds, but before we had completed levelling the instrument it became entirely overcast again.

I have asked Armitage to instruct Fisher in the use of the sextant and compass, and I am taking the doctor in hand. I have given him a few lessons in the use of the sextant and artificial horizon, utilizing a candle to do duty for the sun or a star. It answers very well indeed.

Weather : Midnight to noon, moderate to strong and gentle N.W. winds. From noon to midnight, light airs to moderate winds from S.W., N.W., W.N.W., N., and N.N.E. Gusty in earlier part of day. Fine but cloudy weather generally. Misty at times.

December 19th, Wednesday.—A calm clear day for a change. We moved the sacks of oats from the inside of the dog-house on to the roof, as the dogs were pulling them about. After lunch Armitage and I took observations of Arcturus and Mars with the theodolite for time. This was a very troublesome operation and a cold one, for in a temperature of thirty odd below zero the scales become very difficult to read, owing to their becoming iced over, and nothing will work smoothly, due to the unequal expansion and contraction of the various metal parts. The oil of the theodolite lamp froze, and of course would not burn. However, we got fair results in spite of it all, but observing under these conditions is not a joy. We shall take an observation of the pole-star for position to-morrow, as it crosses the meridian about 10 A.M., if the weather will allow us. The moon is waning fast. It has been of little use this time, owing to cloudy skies.

There is an indescribable charm about moonlight Arctic night

OUR ARCTIC HUT

when the weather is fine. The great dark dome of the heavens seems so far, far away. The stars seem to twinkle with a clearness that pierces everything. There is a stillness, too—a great wonderful silence that impresses one. The aurora, with its ever-changing shape and color, is a constant feast for our eyes, affording a never-failing source of speculation as to its cause. As one



OUR HUTS BY MOONLIGHT IN WINTER

wanders alone over the rugged ice-floes thoughts are apt to turn towards home, thousands of miles away, where life is going on under such different auspices; to wonder how dear friends are and what they are doing; to the dear old mother, left perhaps in bad health. Is she still alive? Shall I ever see her again? are thoughts which chase each other through one's brain.

Suddenly one realizes that giving way to sadness does no good, and determinedly shuts such thoughts out of one's head, but one thinks instead of discoveries to be made, problems solved, and great things to be accomplished.

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Weather : At 2 A.M. gentle N.N.E. wind. At 4 A.M. light E. airs. Then to 8 P.M. calm. At 10 P.M. light E. airs. At midnight calm. Fine clear weather throughout. Loud rushing and whistling sounds caused by ice pressure, much resembling wind rushing through leaves, were heard throughout the day. Aurora all day in bands and streamers chiefly to E. to W., culminating at 8 P.M. in a brilliant display from E. to W., being of spiral, fanlike, and circular shapes. Thick, circular masses in W. extreme, sending out streamers with lateral movements to N. with a fringe of prismatic coloring which again closed up into bands and moved laterally to S. and disappeared, appearing to rise as it did so.

December 20th, Thursday.—Blowing stiffly from the E.N.E. and N.E., increasing in strength as the day advanced, with driving snow. This is a fiendish place for wind!

The following is Fisher's report on the flora of Franz-Josef Land on our arrival :

"On Cape Barents, on the 9th of September, 1894, no phanerogams were to be seen except a solitary stunted grass, which was much too imperfect to identify. It seems to have been frozen before flowering. *Umbilicaria* and a few other small lichens, "red" and "green" snow, and a few mosses, composing the flora of the spot. The rocks here face all quarters, hence there must be no lack of sunlight in summer, but it is doubtless a wind-swept locality.

"*Cape Flora.*—On the 8th of September we arrived here, just in time to see the last flower of *Papaver nudicaule*, which was much battered by cold wind, two petals only being attached. Height of plant, four inches. Fully developed capsules were abundant on Cape Flora. The solitary flower was growing with one plant of *Cochlearia* on the stone wall of Eira Cottage on the south side. This scurvy grass was in flower and fruit. It seemed to be less affected by frost than the poppy.

"*Saxifraga ceroma* had finished flowering and was stunted and discolored by frost.

"*Alopecurus alpinus*, sm., an abundant grass, was in full flower; another grass, probably *Poa Alpina*, L., was too far gone to be of any use. *Saxifraga oppositifolia* had no fruit-stalks attached, so that it is impossible to say whether it had flowered this year or not. However, as the flowers appear in May and June, sufficient time had elapsed for the total disappearance of the fruit-stalks, considering the force of the wind here.

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"*Stellaria Sp.* was barren. There are about as many lichens and mosses here as flowering plants. These plants are all growing on a bank at the foot of the talus. The bank is flat-topped and elevated, about fifty feet above the sea. It is on the southern side of the rugged cliff, which rises to about six hundred feet (approx.). This cliff affords little shelter from any wind. There are no sheltered spots in this part of Franz-Josef Land, so that the flora of this bank may be taken as a sample of that of Southern Franz-Josef Land.

"From what we know of the flora of this part of the world, it is almost certain that the winter of 1894 came on much earlier than usual. Nevertheless, it was evident that some amount of fairly good weather had favored the plants during the short summer. The cold weather of September continued up to the time of writing, so that no further opportunities for investigating the vegetation (as far as phanerogams at least) occurred.

"December 15, 1894."

We took our usual walks and did odd jobs.

Weather : At 2 A.M. light E.N.E. breeze, shifting to E. at 4 A.M., and gradually increasing to strong breeze at noon. At 8 P.M. E.N.E.; at 9 A.M. moderate gale. At midnight strong E. gale. Fine clear weather till 4 P.M., from then till midnight overcast. One hour's fine snow and four hours' thick snow, and driving hard from 2 P.M.

December 21st, Friday.—Last night at 7 P.M. we had some fried bear's liver again after it had been soaked in boiling water, served with a joint of bear. At 12.30 to-night during my watch a severe headache (both frontal and at the crown of the head) came on with a feeling of nausea. This continued until 3 A.M., when my watch ended and I turned in, and, with the exception of some headache, I had recovered at 9 A.M., when I turned out. I had about three ounces of liver. The doctor, Armitage, Maxim, the Russian, Child, and Fisher are more or less similarly affected. Armitage had recovered by breakfast-time. Child vomited twice, and did not feel well again until this evening. The doctor has been very unwell all day, likewise has Maxim. Fisher, who ate only a very little liver, soon recovered. We are all of us quite satisfied now as to bear's liver being poisonous—under certain conditions, at all events. It is probably due to

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some alkaloid in it, or to the action of the juices of the stomach upon some substance in the bear's liver, which then becomes poisonous. We were all of us affected from five to six and a half hours after eating it. The doctor cannot account for it in any way. He has taken particulars of each person's case, and I have desired him to preserve some of the liver in spirit for analysis in London; also I have told him to try a little on one of the dogs, but Kane in his book says it does not affect dogs.*

We are now half-way through the Arctic night, and no one so far looks much the worse for this constant darkness, monotonous to the last degree as it is. We are all as cheery and jolly as crickets, and everything has gone very smoothly and pleasantly.

It is blowing a gale, with driving, hard, cutting snow as usual, now from the northwest, and hardly a day passes without our congratulating ourselves on having a good hut in such an utterly fiendish climate as the winter in this spot proves to be. It is impossible to have regular hours for exercise, owing to the weather, but I turn out all hands whenever feasible.

December 22d, Saturday.—The doctor is still a little seedy from the bear's liver; every one else is now all right.

The members of my party have been occupied in removing furs from No. 3 to No. 1 hut. The snow drives into these store-huts badly, and it is impossible to stop it entirely. It is a much pleasanter day, and a clear sky. The southern sky has rather a lighter appearance near the horizon at noon, but no perceptible light proceeds from there, or affects the constant darkness which prevails.

Weather: Gentle to moderate W.N.W. wind to 7 A.M. Then light W. airs shifting to E. at 10 A.M. Calm at 4 P.M. Light W.N.W. wind at 8

* Professor Vaughan Harley, of University College, London, who kindly examined for me the liver brought back for that purpose, reports that "alcoholic, ethereal and watery extracts of liver tissue introduced by intra-peritoneal and subcutaneous injection had negative results in dogs and guinea-pigs, and a dog given watery extract by the mouth was unaffected. Two mice subcutaneously inoculated with 1 c.c. each of ethereal extract died three days afterwards, but it is difficult to say if this was not accidental. Watery and alcoholic extracts had no effect upon mice when subcutaneously injected."

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P.M.; N.W. at 10 P.M. Gentle E.N.E. wind at midnight. Fine and clear to 8 A.M., and from then till midnight overcast. At 8 A.M. snow falling in stellate-shaped crystals similar to those of September 29th. Ten hours' snow. Erected the anemometer (Beckley's) at 2 P.M. over the stable, nineteen feet from the ground, well clear of any obstruction (1 division on the anemometer = 500 revolutions of its cups).

December 23d, Sunday.—Did a few odd jobs about the place. Weather is vile as usual.

December 24th, Monday.—I sent down to the ship a few things as presents for Christmas—including fifty tins of herring, twenty tins of haddock, twenty-eight pounds of cheese, four bottles of whiskey (of one quart and a half each), five tins of cut tobacco, four large bottles of pickles, from our stores; and the carcass of a reindeer which had been saved for our Christmas dinner. I also sent some packs of cards and our bagatelle-board for them to use. A few of the crew serenaded us just before midnight.

Driving snow and high wind and a low temperature make the weather a trifle unpleasant to-day. Several of my fellows got frozen faces when out.

Weather: From midnight till 8 P.M. fresh to gentle and moderate W.N.W. wind. At 10 P.M. moderate N.W. wind. At midnight W.N.W. Fine but hazy weather throughout till 10 P.M. and then calm. Snow driving throughout.

CHAPTER V

A CHRISTMAS FESTIVAL, 1895

December 25th, Tuesday (Christmas Day).—I received a Christmas present at breakfast-time in the shape of a fictional book, *The Paradise of the North*, by Lawson Johnston, and a Christmas-card from Jefferson. He had intrusted them to Armitage to give to me on Christmas Day. It is very nice of him. All the members of the expedition also received cards from him, and were much appreciated by them. I received a note from the captain saying that he feels too unwell to dine with us at the hut as invited. I went down to the ship to wish all hands a happy Christmas, and inquired if there was anything I could do to render it so.

I found all looking very happy and comfortable. The stove blazing in the forecastle shed a rosy glow over the rough benches and bunks, and the paraffin-lamps hanging from the deck above lighted up the rude cabin. Some attempts had even been made at decoration—a difficult thing to effect in a land of ice and snow, where all is dead and such a thing as a green leaf does not exist—with colored paper and weird texts of truly original composition. Poor fellows; in spite of all the privations and many discomforts incidental to their life in this desolate region, all had a cheery word to say and a word of thanks for the little we can do to make their Christmas something like a “merry” one.

When leaving, they turned out on deck and gave me three cheers, and sang “For he’s a jolly good fellow”; and their spokesman thanked me for “my kindness, and for having considered their comfort in so many ways since leaving England.” It amply repaid me for any little trouble I might have given myself on their behalf.

At lunch I received a present of three photographs of the Thames at Windsor from Child, which he had carefully mounted.

We had a capital dinner at seven o’clock, roast bear and some

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reindeer sent up from the ship being the joints, which were washed down with two out of our three remaining bottles of a dozen of champagne we started with. We carefully reserved the last bottle for next Christmas. A bottle of sherry and a little port followed. We also tried some liqueur manufactured by Child, which has been christened "Liqueur Polaris." It is really fairly good, but considering that it is made of sixty overproof spirit, a little goes a very long way indeed.

The ship's cook has succeeded in making for us and the crew some very fair plum-puddings, minus, however, most of the usually necessary ingredients. But bear, and plum-pudding, more or less without the plums, made a very fine Christmas dinner. Anyhow, we thought so.

At dinner I proposed as the first toast "The health of Her Majesty the Queen of Great Britain, Ireland, and Franz-Josef Land, and may she live long enough to be proud of her possessions on or about the latitude of 90° north."

I then proposed the health of "Mr. and Mrs. Harmsworth and all our friends." The doctor drank to "Mr. Montefiore."

Armitage proposed the health of "Our Leader," and among other complimentary remarks stated that "he ('our leader') is a bad one to beat, but a good one to follow, and if we stick to him we shall be all right." They sang, "For he's a jolly good fellow," and gave me three cheers.

I replied, thanking the members of the expedition for the way they have backed me up and assisted me in what work we have already accomplished, and told them that with such good fellows as they I feel great hopes of reaching the pole if only the land does not fail us.

I then proposed the health of Dr. Nansen and his party, and wished him success. We thought of the many kind friends who will be giving us a thought to-day and drinking good luck to us, and wished that they could see us here safe and well, and as jolly as sand-boys, as I fear that the non-return of the *Windward* will cause much anxiety, especially if they hear of our going ashore at Kharborova. The circumstances of her departure from Archangel too did not look promising. I have no doubt that there has been the usual brigade remarking "I told you so" croaking out their raven-like expressions of opinion of ill-fate, and that "the ship has gone to the bottom."

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I sent the captain some port-wine and a few cigars down to the ship, as he had written me he is too unwell to come here to dinner.

We spent a very pleasant evening, and every one much enjoyed himself. We finished up the evening with songs, accompanied by the musical box, the walls echoing with "Rule Britannia," "John Peel," etc.

Weather: Moderate W.N.W. wind till 6 A.M. Then till 10 P.M. unsteady in the N., N.W., and E., varying between light airs and fresh winds. At midnight moderate N.E. wind. Fine clear weather throughout.

December 26th, Wednesday.—I received a letter from the first mate thanking me, on behalf of himself and the ship's company, for "my kindness," etc. They all enjoyed their Christmas, I think, poor chaps.

A pleasant improvement in the weather; very little wind for a change, and a clear sky.

December 28th, Friday.—Armitage, who had come on watch at 8 A.M., awoke me at that time to tell me that the dogs were barking near the ship, and that the ship's bell was ringing. I knew it either meant a bear or else a fire on board. I hurried into some of my clothes, and he and I started off with our rifles. On the way we met Blomkvist and two other men. He explained that two bears had come to the ship, and that he and Jenkins had started for the hut with a rifle to tell me, but that one of the bears had "gone for" them close to the ship, and had chased them on board; Jenkins, through slipping, had a near shave. They then rang the bell.

On getting on board he shot the bear through the head from the deck at about four yards' distance.

I saw the bear put on board, and then Armitage and I started off back towards the hut, as the other bear had apparently cleared out. It was very dark, as there was no moon, and it was quite useless to look for him, for one could not distinguish such an object fifty yards distant at all. We had not gone more than a hundred yards when shouts and the ringing of the ship's bell fetched us back, and we found the second bear prowling round the ship, but keeping a little way off; we only knew he was near by the behavior of the dogs. I lay down and acted the movements of a seal on the ice to draw him up, and immediately two of the

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dogs rushed barking into the darkness, and I followed them, and soon could make out "Mr. Bear" by his hissing and snarling. As soon as he spotted Armitage and me, he came at us at a good round pace. I allowed him to come within ten yards, and then dropped him with a shot through the head, and he fell like a stone, quite dead. Both are fine he-bears in good condition, but with nothing whatever in their stomachs and intestines. These are the only bears seen since November 14th. Hunger is evidently making these chaps bolder.

A pleasant, cold, calm day, but very dark.

Armitage and I took further star observations in the afternoon and evening with sextant and artificial horizon.

Weather: At 8 A.M. moderate decreasing gale. At 10 A.M. calm. At noon a light N. wind, shifting to N.W. at 2 P.M. At midnight light N.W. wind. Fine clear weather throughout. At 2 P.M. auroral streamers to N. and N.W., with a fringe of prismatic coloring. Altitude 30°. Bands across heavens from E. to W., moving laterally from N. to S. at frequent intervals during afternoon. Ice to the offing cracking and roaring loudly under the influence of tide and pressure.

December 29th, Saturday.—I set the carpenter to try to remove the green paint from the collapsible tents, as it has become as hard as a rock from the frost, and they are useless in their present condition, in spite of the maker's assertion that "his paint" would not become stiff with cold. I am very glad now that I insisted upon one being made of Willesden canvas. Petersen is reducing the elk-skin boots to more usable proportions; they will then be very serviceable. One day is as like another as two peas, and there is little to chronicle.

Weather: Wind varying between gentle and moderate N.W. and W.N.W. until 6 P.M. At 8 P.M. moderate N.N.E. wind. At 10 P.M. light N. airs. At midnight fresh N. wind. Overcast and misty weather generally. Fine snow for four hours. Snow driving slightly. Aurora throughout day generally E. to W. Altitude 10° to 50°.

January 1st, 1895, Tuesday.—So dawns a new year. What will it bring forth? Shall we all be alive this time twelvemonth, or will some of us have lost the numbers of our mess? Who can say? Maybe our dearest wishes will be well on the road to realization; more likely disappointment will be our fate, which is the common end of most hopes.

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This is the second New-Year in succession that I have wintered in the Arctic. Last year I spent the greater part of this festive season in a snow-drift on the frozen shores of the White Sea, when returning from my expedition through Waigatz and the Bolshaia Zemelskija Tundra country, where I had gone to explore and thoroughly test all the furs, sledges, and equipment I intended to use on the present one. I am sorry for the ship's crew, who had no wish or intention to winter here, but were caught in the ice like rats in a trap. They are getting very tired of it all, and wish themselves at home again, poor chaps!

At 1 A.M. I went for a walk, taking the dogs with me, as far as Sharpe's Rock. No moon yet, so it is quite dark, day and night, although when the sky clears there is a very faint twilight at noon for an hour or so. We shall be very thankful when this long night is over.

We cut a view to-day through the drift to the north of the observatory to put up a mark on true north, to use when observing with the magnetic instruments. We put some more of the oats in sacks upon the roof of the stable. Armitage and I at 6.30 P.M. took an observation of the pole-star with the theodolite to get the true north.

We had quite an aldermanic dinner at 7 P.M. of bear and pudding, and passed the evening very pleasantly with smokes and song. I intend to test one of the reindeer sleeping-bags to-night after my watch ends at 3 A.M.

Weather : Light W. by N. and W. winds till 10 A.M. At noon light variable airs. From 4 P.M. till midnight light to strong E. by S. wind. Fine clear weather throughout. At 2 A.M. auroral streamers extending all over heavens. Then none to 6 P.M., when one small streamer appeared in N.W. At 10 P.M. streamers W. to S.W. at altitude 10° to 70° . At midnight corona in zenith with streamers shooting out all over heavens, having rapid circular and lateral motions. Laid out our true meridian to-day.

January 2d, Wednesday.—After my watch ended at 3 A.M. I took a reindeer sleeping-bag up on to the roof of the hut to give it a trial. I wore my ordinary cloth clothes, and took my militza with me to put over the mouth of the bag. The sleeping-bags are of reindeer-skin, about 6 ft. 6 in. in length and 26 in. wide, with an aperture at one end buttoned over with hide loops and but-

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tons, through which one gradually forces one's body to get inside; the loops are then buttoned over again, covering up the head and face. The thermometer stood at twenty-three degrees below zero, with a gale of wind from the east; so the weather was all I could desire, and a bit more, to give it a good test. I camped, with no other cover than the single bag, upon the flat



THE DOG-KENNEL AND LOG-STABLE OBSERVATORY AND THERMOMETER SCREEN
(BY MOONLIGHT)

roof of the hut. The position is very exposed to the wind, and also out of reach of any prowling bear, who on the ground might come up and find his game literally bagged for him. The gale, combined with the low temperature, made my night's camp a very unpleasant one, especially as neuralgia for an hour and a half did not conduce to my comfort. I was half afraid, too, of being blown off the roof; my militza cover was carried away, as likewise was my cap, which I had stuffed into a gaping aperture in the sleeping-bag to endeavor to keep out the wind. I, however, stuck to it, and managed to get some sleep; but it was bitterly cold, and I came down at 9.30 A.M. with both my hands rather badly frost-bitten, bringing down my sleeping-bag and militza

A THOUSAND DAYS IN THE ARCTIC

under considerable difficulties in the driving snow and high gale, which was still blowing with unabated force. They have been distinctly painful all day, and I expect I shall lose the nail of one finger. I found the bag anything but satisfactory in several respects, which I must alter. The spring tides now running crack the ice very much. A steady roar has been going on all day among the floes.

Weather : Moderate E. by S. gale, shifting to E. at 6 A.M., and E.S.E. at 2 P.M., decreasing to moderate wind at 10 P.M. Fine clear weather till 4 A.M., and from then till midnight overcast. Nine hours' thick snow and four hours' light snow, and snow driving hard during the greater part of the day.

January 3d, Thursday.—I set Petersen to alter the sleeping-bag. I am quite changing its form by making it to draw tight round the neck and having a hood to cover the head ; thus keeping the warm air inside, and the cold air out, and avoiding breathing inside the bag itself, which causes so much moisture. I shall try this form of bag as soon as it is finished.

I went down to the ship and saw the captain, and told him to obtain from the cook an exact statement as to the amount of sugar and flour remaining on board, and he sent up a letter in the afternoon giving me these particulars. I am sending supplies of flour and sugar down to-morrow.

Armitage and I took observations with the dip-circle to obtain the magnetic meridian.

Walruses were heard in the distance to the south of the ship to-night.

January 5th, Saturday.—A break in the cloudy sky occurred about 2 P.M. for an hour or two ; we took advantage of it to do a little ski-running down the steep slope up which we dragged our stores last autumn, now drifted up into a less precipitous incline. The top of the slope is about fifty feet above sea-level, and the floe lies at the foot of it.

The sky clouded over again about 5 P.M., with falling snow and a rising wind from the east, which put an end to our sport.

The ceiling of the hut, especially over my cabin, is dripping with water owing to the rise of temperature. I think snow must have driven into the space between the ceiling and the roof.

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The needle of the dip-circle showed a disturbance passing over about 5.30 P.M. I find that to keep the ship in sugar till the end of July will take nearly half our sugar, or 630 lbs.

January 6th, Sunday.—I put it to the vote as to whether prayers should be read on Sundays or not, as some dislike had been shown in reference to it. All but one expressed indifference on the subject, but as one man wished it I directed that they should be read, as before, in the future.

As the weather has been fine, with sky clear most of the day, we all went ski-running down the slope again.

Armitage and I took observations of Mars and Arcturus for longitude.

I set Fisher to test our tinned tomatoes for lead. The *Jeannette* Expedition suffered from lead-poisoning through solder having been allowed to fall into the tins when being fastened up. Ours are American tinned tomatoes, too, and may be contaminated in a similar manner.

January 7th, Monday.—My cabin is again dripping with water from the ceiling. I had some of the boards taken off the roof, and found the space between it and the roof filled with snow, which had driven in through a small space of about three-quarters of an inch in length left between the wall and the roof, and the heat of the hut is slowly melting it when the temperature rises outside. I had five hands up from the ship to assist in calking and clearing the snow out. Most of the expedition were engaged all day in clearing away some huge snow-drifts which have formed against the hut inside the barriers, one reaching to the roof on the southwest side, up which the dogs were able to reach our larder of bear's-meat on the top.

January 8th, Tuesday.—All the expedition did some ski-running down the slopes; but the wind has hardened the snow very much. During the morning they were engaged in cutting through and clearing away snow-drifts near the hut. In separating "Sam" and "Jinnie" (two Samoyad dogs), who were fighting, I got my left hand bitten in three places, and it is a little painful, and uncomfortable to use for any heavy work.

There is a good deal of open water towards Bell Island and Cape Grant, and also to the southwest and south about five miles from the ship in those directions, and two miles off towards Bell Island.

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Weather: At 2 A.M. gentle N.E. wind. Light S.E. airs at 4 A.M., N.E. at 6 A.M., increasing to moderate breeze at 8 A.M., and shifting through N.E. and N. to N.N.W. Gentle breeze at noon from N.N.W. Light W. wind at 4 P.M., backing to gentle N.N.W. wind at 8 P.M. till midnight.

At noon observed an orange glow on southern horizon. Cloudless sky between 5 A.M. and 2 P.M. Overcast between 3 P.M. and 7 P.M., and then fine but cloudy weather. Three and a half hours' snow.

January 9th, Wednesday.—A beautiful moonlight day, without much wind. A bear was seen by Smith (the second engineer) from the ship at about 5 P.M. near the berg at the point. He shouted to me, as I had walked towards the ship, being attracted by the barking of the dogs. I ran back for my rifle, and one of my men and I started in pursuit. The bear had in the mean time disappeared, but with the aid of the dogs I got on his tracks and came up to him to find "Räwing" (one of our best bear dogs) and he having a sparring-match on the top of a berg at "Bear Corner" about a mile to the south of the ship on the floe. I succeeded in finishing him with three shots from my Henry Express. It was a young he-bear fully grown. He had only a little undigested brown paper in his stomach. They are wonderful animals for eating anything. Nothing seems to go amiss with them. The paper he had of course picked up from a rubbish heap.

Armitage got out the astronomical telescope and had a look at the moon and Jupiter. I went for a walk at 10 P.M., accompanied by one of my men. We climbed the ice slope at the west point of Cape Flora for some distance.

My hand is painful and swollen from the bites of yesterday, as also are the glands under my left arm.

Weather: Gentle N. wind at 2 A.M. Fresh and moderate N.W. at 4 and 6 A.M., decreasing to calm at noon. Light variable airs at 6 P.M., S.E. at 8 P.M., increasing to a gentle wind at midnight. Cloudy, overcast weather till 6 A.M. Fine clear weather till 7 P.M. generally. Overcast and cloudy till midnight.

At 6 P.M. a circular-shaped aurora to N. and N.W. with streamers.

January 10th, Thursday.—Snowing and blowing most of the day. I mended my fur finisko with twine—rather a neat job, I flatter myself—although my lady friends might quibble at my darning operations.

A dog was heard at 8 P.M. barking (as if at a bear) up the talus

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from the rocks behind the hut. The talus below the cliffs is a steep stony slope of about 40° , caused by the weathering and breaking down of the rocks above; it averages about six hundred feet in height. Burgess and I started off with our rifles, followed by all the members of the expedition and a number of the dogs. The barking still continuing, Burgess, Heyward, and I climbed the talus, which is covered with ice and snow and very steep, making our clamber a difficult and rather hazardous one, but we want more fresh meat, and a bear is always worth a little trouble. At last we reached the top of the talus under the rock face, six hundred feet above the sea, somewhat puffed and heated, to find that the dog perched up there was yapping at nothing at all. All the other members of the party had turned back after going a short distance up. The dogs which had followed, apparently exasperated at the deception practised upon us all, at once set upon the barking canine and would have killed him but for our intervention. I cannot imagine what took the dog up to such an inaccessible point to bark a solo by himself! I am inclined to think he went up and was afraid to attempt to come down in the darkness, as it looks very much like a pit below one when looking down.

It took us over an hour to climb up, and longer to come down, and was pretty tough work. We had to use the butt-ends of our rifles to knock steps in the ice-slopes a great part of the way to get any foothold. I have christened the dog "Joker," from the practical joke he played us.

Weather: Gentle to strong and light E.S.E. winds till 8 P.M. Light N.E. and N. by W. winds till midnight. Overcast throughout. Misty from noon till 10 P.M. Nine and a half hours' snow.

January 11th, Friday.—A rise in temperature to 25° F. Three of us did some ski-ing down the steep slopes by "Dead Dog Gully," where "Carlo" killed a dog, on to the floe. The snow was, however, very sticky and bad going. Snowing all the time.

Weather: Light airs and winds from W. and W.S.W. till 10 A.M. Then light to gentle S.W. breeze to 6 P.M. At 8 P.M. moderate W. wind. At 10 P.M. gentle N.W. by N. breeze. At midnight moderate N. wind. Overcast and misty weather almost throughout. Eight and a half hours' snow. I shifted the wind thermometers to the anemometer pole.

A THOUSAND DAYS IN THE ARCTIC

January 12th, Saturday.—Colder again, it being 15° below zero this morning. I have again lent the crew our bagatelle-board. Their life must be rather monotonous, poor fellows. They fetched one of our large casks to pickle the bear-skins in.

A dog was found at 8 P.M. lying near the observatory, at his last gasp. I picked him up and carried him into the house, where he died on being brought in, in spite of injections of whiskey and artificial respiration being tried upon him. On examining him an eruption was found on his body, and he had lost a good deal of hair from the abdomen, suggesting mange, but nothing to show any cause of death, unless the loss of hair exposing him to the cold accounts for it. We buried him in the ice-bank on the edge of the cliffs. I hope he died of nothing contagious. I shall carefully watch the other dogs.

January 13th, Sunday.—I went for a walk on the floe this morning as far as "Bear Corner," and again at 10 P.M., about a mile and a half to the southwest past that point. There is evidently less wind off shore, as the snow lies thicker and less hard out there. There has been much pressure about a mile and a half from the ship, hummocks being piled up ten or fifteen feet high. The position of the *Windward* is out of the force of the tideway and current, and removed from the running pack.

I took with Armitage observations of the pole-star for true north, making it as before, and also of Mars for latitude; he makes our latitude to be $79^{\circ} 57' 30''$ N., or nearly as on previous occasions.

All of us were again weighed this evening, our weights being much as when weighed three weeks ago. I have increased by three pounds, and another man by one and a half pounds. This now makes my weight 13 stone 7 lbs. I set the doctor and Maxim to carefully examine all the dogs for any skin or other disease. They found only one dog, "Mickie," slightly affected by rash on the abdomen, which is evidently a little irritable, and the hair is coming off a little around it. The dog is quite well in all other respects. The doctor is making some sulphur ointment for it, and will give the dog some sulphur internally.

January 14th, Monday.—Snowing and blowing hard most of the day, with towards night a temperature of 23° F. below zero. A very unpleasant day, and very dark, in spite of the fact that we are supposed to have a moon now. I took a walk about



THE ICE-FLOES BY MOONLIGHT

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noon, but owing to the darkness it was difficult to avoid tumbling about, so had one or two nasty spills over hummocks. Two others and I were engaged in the afternoon in removing some drifts around the house. This is an extraordinarily changeable climate here, with its great fluctuations of temperature.

Weather: At 2 A.M. fresh E. wind, increasing to fresh gale at 4 A.M., decreasing between 6 and 8 P.M. to moderate E. by S. wind. Light airs from E.S.E. at noon. At 1.15 P.M. shifted to N.E., and rapidly rose to a moderate gale. At 4 and 6 P.M. fresh and strong N. wind. At 8 P.M. strong N.N.W. wind, increasing and veering to fresh N.E. gale at midnight. At 2 A.M. cloudless but misty. At 4 A.M. till midnight overcast misty weather, frequently squally between 4 P.M. and midnight. Seventeen hours' fine powdery snow. Four hours' thick snow. Gusts during gale of force 7 to 10.

January 15th, Tuesday.—Went down to the ship at 1 P.M. The skipper tells me that he is again nearly out of oil and that he has no oatmeal.

The members of the expedition engaged in clearing away snow-drifts around the house.

January 16th, Wednesday.—I sent the skipper some oatmeal and oil. The returning sun now makes perceptible difference to the light for an hour or two about noon if the sky is clear.

Clearing away snow-drifts for exercise. Nothing very exciting—darkness, cold, monotony, that is our usual day's round. The same yesterday, to-day, and to-morrow. Such is an Arctic winter.

January 17th, Thursday.—After my watch at 2 A.M. I took the altered sleeping-bag on to the roof to try it by sleeping in it there, the advantage of the roof being the freedom from bears and exposure to the weather. The temperature at 31° below zero, but no wind. This time I had not to hold on, but lay in comparative comfort, and slept, or would have slept, but for outward disturbances.

A bear was evidently prowling around, which was shown by the behavior of the dogs, but although I several times rolled out of my furry bag and walked to the top of the cliffs overlooking the floe, I could not see him. At 6 A.M. I came down and got my rifle and searched for him on the floe, for by the way the dogs rushed out upon the plateau, barking violently, I felt sure he had come within sixty or seventy yards of the hut. I could not find

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him, however, as it was too dark to see more than a few yards ahead.

In the evening I gave the doctor a lesson in the use of the sextant and artificial horizon. Armitage and I took observations of Mars and Arcturus with the theodolite at 2 P.M., and got out the astronomical telescope to view and time the eclipse of one of Jupiter's satellites at 4.30 P.M., but a mist prevented this.

Weather: Moderate wind to gale between N.W. and W.N.W., with furious gusts of force 6 to 9 throughout the day. From midnight to 10 A.M. misty all round near the surface of the earth. Fine and clear, though cloudy at times overhead.

January 18th, Friday.—The temperature again down to 31° below zero, and a stiff breeze, increasing as the day advanced. Took a walk out to "Bear Corner" in the morning. While at lunch, Sunding came up to say that a bear had been seen close to the ship a few minutes before he left there. Armitage and I started off with our rifles and some of the dogs, and after casting about for some time managed to get the dogs on to the track of the bear, which was making off towards the open water to the south of the ship. After a long chase in the darkness of over two miles, I succeeded in coming up with him, and killed him with one shot from my double Express rifle. Armitage joined me, having got behind in the chase, and I sent him back to the ship to bring up a sledge-party and sledge, I staying by the bear to avoid the very good chance otherwise of losing the spot in the dark, owing to the distance from the ship. I took a seat on a hummock for a few minutes, feeling rather blown and warm after my chase, but soon the cold made itself felt, the bitter wind and driving snow blew through my clothes, and I was soon glad to march rapidly up and down to keep from freezing. In the distance the roar of ice-pressure thundered out in the darkness, and around was a nearly dim white circle of ice blocks which was every now and then quite obliterated by a violent gust of wind carrying with it a cloud of fine powdery snow. Occasionally I blew my whistle and "coo-oo-ee-ed"—an Australian bush call—to aid Armitage in finding me. And so the time passed on. After a long wait he led them back to the spot, having marked his course by the stars. We had a very heavy pull over the rough hummocky ice in the darkness and in the teeth of a gale of wind, driv-

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ing snow before it, and a temperature of 31° F. below zero. Most of us got more or less frost-bitten about the face or hands; and two of the men have large blisters on their wrists. I had the party up at the hut afterwards, and entertained them at tea. The wind to-day much increased in force as we approached Cape



A BEAR-HUNT IN THE POLAR NIGHT

Flora, the snow at a distance from the land being comparatively soft, and indicating that there has been much less wind seaward.

Weather: Light to gentle N.W. wind to 6 A.M. At 8 A.M. gentle to moderate N.E. wind, increasing to moderate wind at noon, and strong breeze at 4 P.M., veering to N.N.E. at 8 P.M. Moderate N.E. by N. gale at 10 P.M., and the same from N.E. at midnight. Fine clear weather generally. Cloudy and misty at times. At 8 A.M. auroral streamers in E. and



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S.W. at from 50° to 70° altitude. At noon indistinct corona in zenith with streamers radiating all round heavens, evidently very distant. At 4 P.M. auroral band across heavens E. through zenith to W. with a number of brilliant fan-shaped streamers to N.W. and W., colored at edges rose and green. At 6 P.M. a band from E. through S. to W. At 8 P.M. similar bands, altitude 5° to 20° . Midnight, streamers in E., E.N.E., and W.

January 19th, Saturday.—Went for a walk on the floe past "Bear Corner." A moderate gale was blowing at the hut and ship, but decreased to a light breeze as I got away from the shore, and on my return I walked into it again as I approached the land.

The sun is rapidly returning now, giving quite a moderately light twilight for an hour or two about noon.

Weather: At 2 A.M. strong N.E. wind, veering to N.E. by N. at 8 A.M. and light N. by E. wind at 10 A.M. At noon N.E. At 2 P.M. variable winds. From 4 to 10 P.M. moderate to fresh N.E. wind. At midnight gentle E.N.E. wind. Fine clear weather throughout. At 2 A.M. two small streamers in zenith. At 4 A.M. a regular band across zenith N.E. to S.W. At 6 A.M. corona with streamers radiating from it around heavens. At noon two small streamers in N.W. At 2 P.M. sinuous auroral band E. to W. At 8 P.M. auroral band E. through S. to W., at altitude 5° to 15° . At 9.15 P.M. corona in zenith streamers around heavens, moving round and disappearing at 9.25 P.M. At 10 P.M. auroral bands and streamers in N. and N.W. At midnight band at N.E., altitude 6° .

January 20th, Sunday.—"William" came up as we were finishing breakfast to say that a bear was near the ship. I started Armitage and Burgess off with rifles and dogs in chase. As it was my turn for a bath that morning, I was at that moment engaged in taking it. However, I followed as soon as I could tumble into my clothes. Armitage succeeded in killing it on the top of a berg, where it was sparring with the dogs, to the west of the ship. It proved to be a very large he-bear. I turned out the crew and we sledged it to the ship.

Armitage and I went for a walk about 12.30 P.M. past "Bear Corner." Tried to-day in the government .303 rifle some rifleite and government cordite cartridges, which I had kept all through the winter under the thermometer screen, and which had been subjected to a temperature as low as 38° below zero. Found on firing that they are quite undamaged. The rifle, now that only

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paraffin and not oil is used on the bolt, acts perfectly, and does not clog as before. Early in the autumn, with the striker oiled in a temperature of about zero, the oil froze and the striker stuck, with the result that the gun would not go off, an awkward predicament with a rowdy bear.

Weather: Calm till 6 P.M., then light airs and winds till midnight from E.S.E. Fine clear weather throughout.

At 2 A.M. band from E.N.E. over zenith to W.S.W. At 1 A.M. corona in zenith with streamers radiating around heavens, especially in S. and E. At 4 P.M. brilliant pale-green thick auroral band from E. to W., waved in outline. At 6 P.M. five bands across sky from E. through zenith to W., coming to a common focus at each point. At 8 P.M. two bands E. through S. to W., altitude 10° . At midnight a few cumulus-like patches N.W. and S.W.

January 21st, Monday.—East and southeast winds to-day, without an immediate rise of temperature or snow as usually experienced. Evidently the open water to the east and southeast has frozen over during the recent comparatively calm weather. I noticed to-day how readily red absorbs heat by means of rays of light. The frost has not formed on the red portion of the pattern on the felt covering the walls near the door, but has thickly on the surrounding gray, leaving the red quite bare. The ice off the land is very noisy to-day, having been shrieking and roaring continuously. It is evidently in considerable motion.

The mate came up from the ship for shovels and a pick to remove the snow, ice, and rubbish from the port side, as I had pointed out to the skipper that this must be done, or there will be trouble in getting the ship free in the summer. It is a day or two since the neap tides.

Weather: At 2 A.M. light S.E. wind. At 4 A.M. gentle E.S.E. wind, decreasing to light breeze at 8 A.M. and veering at midnight to E. by S. Fine clear weather till noon, and from then till midnight misty.

At 2 A.M. a similar aurora to that of midnight of 20th. At 4 A.M. the same in E. and S.E. At 8 A.M. corona in zenith with streamers radiating from it between W. (through N.) to E. At 4 P.M. a band from E. (through S.). Altitude 40° . At 10 P.M. faint but numerous arches all over the heavens, chiefly E. to W. and intercrossing.

January 22d, Tuesday.—The sun will rise again for the first time this year one month from to-day (February 22d). We count the days like a school-boy does the hours to his holidays. For the

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sun means better health, better temper, better spirits, and this monotonous existence will, at all events, improve, and we can start our march northward. Even the hour or two of dawn-like twilight which we now have at mid-day has an exhilarating and cheering effect on every one, which lasts throughout the day. I now turn every one out at mid-day for a walk of three or four miles, as mid-day and midnight are no longer exactly alike.

January 23d, Wednesday.—To-day I went for a walk about 12.30 P.M. with the dogs on the floe. When about one and a half miles to the west of the ship I came across a bear and put the dogs on to him, and started off for the hut to get my rifle. The ship people heard the barking of the dogs as the bear made for the shore, and rang the ship's bell, not knowing that I was already on the floe. Met Armitage and Dunsford with rifles on my way. The bear made for the land and mounted the talus below the rocks of Cape Flora. After a long run I clambered up the steep slope and got within fifty yards of him, but he then made off along the top under the rocks towards the west, and as the light was very dim I was afraid of hitting a dog, so abstained from firing, but hoped to get nearer to him. He, however, cleared out towards the ice-slopes, and I never saw him again, for after descending the talus with as much speed as possible, I heard the barking of the dogs away over the distant glacier. This I ascended for about three-quarters of its altitude, but the sound of the dogs had died away by the time I reached this point. All the rest of the party had returned to the hut. The light on the glacier with a mist was so bad that the ice immediately under one's feet could not be distinguished, and hollows and rises had one uniform appearance owing to all absence of shadow, rendering falls innumerable. A stiff wind had got up, preventing the hearing of any barking. I stopped and blew my whistle to try and recall the dogs. Two only returned ("Beauty" and "Jinnie"), although I waited for half an hour, blowing continuously. It was quite useless trying to look for them, owing to the mist and darkness and the uncertainty as to the direction in which they had gone, and clambering about on the glacier under these conditions was a little dangerous. After my return to the hut, having had something to eat, I started west again, accompanied by Fisher and the doctor, and we blew our whistles to try and recover our four dogs ("Räwing," "Nimrod," "Sammie,"

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and "Sallie"). At 11 P.M. to-night they have not returned, so I have organized five search parties to look for them to-morrow if they have not come back. Am anxious about them.

Weather: Light variable airs and calm throughout. Cloudy and misty at times. At 10 P.M. a few cloud-like and serpentine-shaped auroral patches and bands in zenith and W.S.W. moving to eastward.

January 24th, Thursday.—Sent out five search parties to look for the missing dogs in different directions, each with rifles and whistles. It is a beautiful calm day, with a clear sky and a temperature below zero and lighter at mid-day than it has yet been at all. The stars shone brightly at noon with a little aurora.

Having started off these parties, Armitage and I took our line across the fies in the direction of Cape Grant, but were stopped by an open stream of water about three miles and a half to the west of the ship. We then proceeded up the channel between Bell and Mabel Islands and Cape Flora, firing shots and blowing our whistles frequently, and finally returned along the foot of the glacier upon which the dogs were last seen. On getting back we found all the parties had returned unsuccessful. It was quite dark by 2 P.M. again.

January 25th, Friday.—Blowing a gale, with a temperature of twenty-six degrees below zero. Too severe to send out search parties. It is bad weather for our poor dogs, but the wind being from the north, if they should have strayed in that direction, it may induce them to come south, owing to an inclination all animals have in severe weather to turn and move with their backs to the wind. Started off just before noon for the glacier, which I ascended for some distance, but could find no trace of the dogs. The wind, with the low temperature (it must have been lower than thirty below zero on the glacier), was very trying; it whistled through my clothes and froze part of the inside of my right thigh so that I had to stop to rub it. It conveyed a sensation somewhat resembling a hot coal. The whistle which I carried in my breeches pocket stuck to my lips and burnt them, and it took me fully a minute to release it, leaving a blister behind. Later on in the day, when the wind had fallen a little, I went east on my search, but it all ended fruitlessly.

Shall send out search parties to-morrow if the weather is not

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too severe, leaving at 10 A.M., so as to secure all the twilight given to us.

January 26th, Saturday.—Sent out two search parties to endeavor to find our dogs, and Armitage and I formed a third by going round the point of Cape Flora up Miers Channel and back through Windy Gully. The two parties left at 10 A.M. with a slight breeze blowing and a temperature 29° below zero, carrying lanterns, as I thought the light might attract the dogs' attention if any were in view. Armitage and I, after going a short distance, found the wind, which was from the north, rapidly increase in force until it blew a fresh gale, and as we rounded the point it blew directly in our faces, making an advance very difficult and trying indeed. We proceeded by walking forward for fifty yards, when we turned our backs to the wind for a minute, and then went on again. We had no furs on, but our faces were covered up with the exception of our eyes. The fine, hard snow driven off the glaciers before the wind did not increase the comfort of our march, but cut our eyes like shot. We struck up Miers Channel for some distance until we came well within sight of Windward Island, to try and hit off the tracks of the bear and dogs. We then crossed over on to the glacier on the north side of Windy Gully, where some distance up we came across them, trending downward in the direction of Windward Island. The snow, however, was so hard that they could only be followed a very short distance, but doubtless they have gone up Miers Channel directly north. We then turned back towards the hut through Windy Gully, where the wind blew an absolute blizzard with a temperature of forty below zero. We fairly ran for our lives, feeling that something serious would happen if we did not get to shelter soon, for the bitter wind fairly whistled through us. I got the outside of my right thigh and the inside of my left frost-bitten through my clothes, making walking a difficulty, also my hands and the small portion of my face round my eyes left exposed were frozen, and my half-chronometer watch in my waistcoat pocket stopped for two hours—no doubt from the cold, which is always liable to cause it. Armitage was similarly inconvenienced, but was not frost-bitten quite as sharply as I was. On returning to the hut at 2 P.M. we found that the other two parties had returned after going only a short distance. I was very glad they did not go on,

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or something serious might have happened. I feel as if I had been badly kicked by a horse on both thighs to-night where frost-bitten, and have a bruised sensation in them. Am afraid our dogs are done for in this fiendish weather with no food, but I don't despair of them yet returning, for on Nares's Expedition dogs were away for much longer periods, but in less severe weather.

There is a lot of open water leading from Bates Channel round to the east of Mabel and Bell Islands and joining with the open water, which is nearly constant between this point and Cape Grant when a northerly or northeasterly wind is blowing.

Weather: Calm till noon. At 2 P.M. light N. airs. At 4 P.M. E. airs. At 6 P.M. light E.S.E. wind. At 6.30 P.M. moderate to fresh N.E. gale continuing till midnight. Misty at 8 A.M., otherwise clear weather throughout.

January 27th, Sunday.—A fine clear day, but with a high wind, and a temperature of 27° F. below zero. I had an anchor-light brought up from the ship and fixed on the roof of the house to attract the dogs' attention if anywhere within view of it. The returning sun will soon overcome the light of the stars at noon on the southern horizon. It caused them to look dim at mid-day to-day.

Frost smoke is visible near Bell and Mabel Islands. It looks as if dense clouds of smoke were rising from the open cracks in the ice. It is due to the comparatively warm vapor given off from the open water and condensing upon the very cold atmosphere above.

January 28th, Monday.—At 6 A.M. I was awakened to be told the news that the dogs had returned, and I turned out of my blankets to give them a welcome. All had done so except "Nimrod." The other three are thin and very hungry, but otherwise all right, and quite brisk and strong. The vitality of these dogs is wonderful. Whether "Nimrod" has been killed by the bear or eaten by his companions I cannot say. I am, however, keeping the lamp on the roof still burning, to attract his attention, if he should still be in the land of the living, as I think it very possibly brought the others back. I took my usual walk with the dogs again at mid-day to look for a bear. Dogs and bears keep us pretty busy one way and another. Saw some recent bear-tracks beyond "Bear Corner."

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Weather : At 2 A.M. gentle N.E. wind, increasing to fresh breeze at 4 A.M., decreasing to light breeze at 6 A.M., and veering to W. at 10 A.M. At noon moderate N.E. wind, at midnight light E. airs. Fine, clear weather throughout. Wind very unsteady both in direction and force.

January 29th, Tuesday.—After great labor we dug a hole eighteen inches to two feet deep in the earth, which is like rock, to enable me to insert a thermometer to record the temperature of the ground near the surface. Having placed the thermometer in the ground we filled the hole in again.

A fine snow falling at midnight, with an apparently perfectly cloudless sky. No wind, and a temperature of 23° F. below zero. I beat the boundaries beyond the line of bergs in search of a bear with the dogs, as usual at noon, for we want more meat. There is now sufficient light to enable us to walk fast over the floe without stumbling. Altered the sleeping-bag again, and I shall try it as soon as I get a thoroughly suitable bad night, which we sha'n't have long to wait for. The altered elk-skin boots, which are my own invention, are voted very good by every one. They are more comfortable to walk in over uneven surfaces, and are warmer than the reindeer-skin finsko, but are heavier, stronger, and more durable.

January 30th, Wednesday.—Went for my usual bear-hunting walk with the dogs at mid-day. The floes near the ship are swept clean of snow in many places, at others the snow lies at varying depths, but is very hard and cut into deep furrows and ridges by the wind. Most of the sastrugi run from east to west. The floes are much cracked, the cracks varying from four inches to two feet six inches in width and filled with soft snow.

Tested the spirit-stove devised by myself, by melting snow outside the house in it, and find it works admirably. The moon now is back in its first quarter. The aluminium pans appear to stand fire well. I directed our cook to use one for heating condensed milk, etc., in, some weeks ago, and it now appears quite unaffected. We are now making preparations for spring sledging. Our winter's dark existence is drawing to a close, and we can begin to look forward once again.

Weather : Calm till 8 A.M., then light E. airs at 10 A.M. Variable at noon, and 2 P.M. light airs and winds from E.S.E. At 4 P.M. moderate wind from E. increasing to fresh gale and veering to E. by S. at midnight.

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Fine, clear weather generally. Misty at times. At 4 A.M. brilliant streamers at altitude of 80° extending to horizon, of pale yellowish-green color, from N.E. to S.W. darting like flames.

February 1st, Friday.—We have been engaged in chopping up bear's-meat very small, mixing spice and dry mustard with it, and then stirring with boiling lard. It is then put out on the roof to freeze. This, I think, will make splendid fresh-meat pemmican for sledging, and very easily fried, or eaten raw if more convenient.

"Carlo" flew at Maxim to-day, knocking him off the pony, while exercising it, in a most unprovoked manner, and then bit



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the pony in the fetlock. Coming on the scene immediately afterwards I gave him a thrashing, when he flew at me, so I caught him and gave him a second one to endeavor to teach him manners. I fear he will die of lead-poisoning yet, as he is very savage, and the terror of Maxim, who has to feed and attend to him, and, so far as I can see, quite useless for anything. Poor old chap, the winter and the conditions of life here have not improved his temper. I sympathize with him.

February 2d, Saturday.—Owing to the moon and the returning

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daylight there is now a good deal of light at noon. We walked to-day southwest from the ship to the edge of the open water, about two miles off the ship. It (the open water) is about four miles across, apparently, but may be wider. It extends to the horizon to the west beyond Cape Grant, and north past the entrance to Eira Harbor. To the east and south it then extends to the horizon. It is only in parts skimmed with bay ice of a few hours' duration.

A remarkably high barometer, 30.784, at midnight (uncorrected to sea-level). The correction would make it higher still.

Weather : At 2 A.M. calm. At 4 P.M. light S.W. wind. At 6 A.M. light N.N.W. wind. At 8 A.M. light N.E. airs and winds. At 10 A.M. E.N.E. At noon moderate N.E. wind. At 2 P.M. N.N.W. At 4 P.M. N.E. At 6 P.M. light W. by N. wind. At 8 P.M. light N. airs. At midnight calm. Cloudy and overcast generally till noon, with a little snow at 2 A.M. After noon fine, clear weather. At 2 A.M. auroral band in zenith disappearing behind clouds. Similar aurora at edge of clouds at 4 A.M. At 6 A.M. faint band across zenith. At 6 P.M. bands and streamers through S. from E. to W., altitude 10° to 40° . At 8 P.M. a similar aurora.

CHAPTER VI

MOTHER BEAR'S NURSERY

February 3d, 1895, Sunday.—The marine barometer is just over thirty-one inches (corrected). Took a walk directly south of the ship to the edge of the ice, about three miles off, and from there could see no ice to the south, although refraction in that direction was very considerable, showing a large extent of open water. Found the tracks of a half-grown cub, followed by those of two dogs, on my way back to the hut about 2 P.M. On my return I was told by Child and the carpenter, who had just run back from Cape Gertrude (four miles off), where they had walked with Crowther to look for a reported spar with a band of iron on it, that "Räwing" had found a bear in a hole there. I jumped on the black pony and rode across the floe, with my rifle, to Cape Gertrude in the twilight, where I found "Räwing" still barking at the entrance to the bear's lair. She had, I could see by the tracks, rushed outside after the dog, but was now back in the hole. As she flounced out at "Räwing," and nearly caught him, I shot her through the head, and she fell backward into the hole quite dead. The lair was situated on the steep, sloping edge of the plateau at the front of the rocks, where it runs down to the frozen sea below. It was deeply covered with a hard, compact snow-drift, the thickness of the snow above the lair being about four feet. The lair had evidently been there for a very considerable period. The opinion I have formed after three years spent in Franz-Josef Land is that polar bears do not, strictly speaking, hibernate at all; but that only the females lay up for a very considerable time to bring forth their young. There were little fæces in the lair. On listening at the entrance I could hear other sounds beyond the dead bear, no doubt proceeding from a cub; but as the sledge which I had ordered to follow me from Cape Flora was long in coming up, and as it required a better

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light than there now was—it was after three o'clock—to take the cub alive, which I am anxious to do, I covered the dead bear and the entrance to the lair up with snow to check the freezing of the carcass, and decided to leave further proceedings till to-morrow morning. The only aperture originally to the lair was a small hole, about three inches in diameter, bridged over in the middle with hard snow—this, of course, before “Räwing” disturbed the bear, when she thrust her head through, making it much larger. “Räwing” proceeded to dig a hole behind her with most consummate impudence, with the evident intention of unearthing her, which afterwards she made use of to come out, but originally the only communication with the outside air was the one small breathing-hole.

Received a letter from the captain to the effect that all the flour on board has now been served out, and that the sugar I sent will all be used on Wednesday week. Our own stores will soon run short at this rate.

Weather: At 2 A.M. calm. At 4 A.M. light N.W. airs. From 6 A.M. to 10 A.M. calm. At 10 A.M. light E.S.E. airs. From noon till 10 P.M. light to gentle E.S.E. winds. At midnight light S.E. winds. Fine clear weather throughout. Unusually clear till 10 P.M., until noon no clouds were visible except long lines of low clouds just above the horizon to S.S.W., S.E., made visible by the reflected light of the sun, more coming in view as the sun got near the horizon at noon. At 2 A.M. arch of aurora E.N.E. to W.S.W., altitude 10° in centre. At 4 A.M. slight patch in S.E. At 10.5 P.M. auroral streamers fan-shaped arising from band at altitude 15° to 40° from E. through S. to W; straw-colored. At 10.15 P.M. streamers collected together in groups and gathered into circular masses.

February 4th, Monday.—At 10 A.M. we started off for Cape Gertrude with two ponies and a sledge, accompanied by all the members of the expedition and some of the crew, to bring back the she-bear I shot yesterday and the cub which I had heard in the hole.

Not knowing the size of the cub, I had made a noose with a rope to slip over its head after digging it out, anticipating a repetition of a struggle I had in East Greenland in 1887 in taking alive a full-grown bear, only less severe in character. This I had lying ready, and as the last few shovelfuls of snow were being removed expectancy was at its height. Great was

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the amusement when a white, soft, fluffy thing, hardly larger than a big cat, appeared, and, instead of a desperate struggle with a savage beast, it was quietly transferred to my arms, where it nestled contentedly as if they had always been its cradle, and was then wrapped up warmly and placed on the sledge to be driven back to the hut.

It was a fine, clear, still morning, with a good deal of twilight, and the temperature some degrees below zero. To the south rosy colors showed the whereabouts of the sun below the horizon, and the promise of the return of it in three weeks exhilarates us all. Fisher and I took measurements and particulars of the lair, and I requested him to make a sketch of it. It was in a snow-bank on the side of a raised beach about eighty feet above the floe, facing S.S.W.

Particulars of Mother.—A she-bear fairly well nourished, but having only about half an inch of blubber under the skin. There was, however, a considerable amount of sub-peritoneal fat, as well as fat in the anterior mediastinum.

Weight, 393 lbs. (very light, indeed, for even a she-bear). Length, 6 ft. 6 in. from end of nose to tip of tail. Girth, 4 ft. 9 in. round the chest. Girth, 4 ft. 9 in. round abdomen. From nose end to line between the ears, 15 in. Between base of the ears, 11 in. Length of fore-leg from top of shoulder to end of claw, 2 ft. 9 in. From elbow to claw end, 10½ in. From heel to claw end, 15 in. Thumb and little finger claws (exserted), 2½ in. Middle claw (exserted), 3½ in. Circumference of head just in front of ears, 2 ft. 3 in.

Nearly forty-eight hours after death, when examined, decomposition had to a great extent set in; and all the organs, as well as the fat and blubber, especially in anterior and under parts, were deeply stained both by post-mortem congestion and the exceedingly dark condition of the blood, some of the veins, etc., having the appearance of actually being pigmented with black pigment. Nothing was found in the stomach or small intestines, but in the large intestines was found a considerable quantity of fæces, consisting of granular matter, bile pigment, hairs like those of her cub and her own skin; and in the rectum some bodies like white blood corpuscles, as well as numerous globules of oil. The liver was intensely dark-colored and congested, especially on the upper surface, where also it was friable, breaking

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down freely before the fingers. The spleen was slightly enlarged, and the uterus had evidently quite recently been occupied, it being also extremely congested, with the lochial discharge still exuding from the vagina. The bladder was empty. The body had the appearance of being in a more or less septic condition, and putrefaction had set in remarkably quick.

To Dr. Koettlitz I am indebted for these particulars, who examined the body at my request.

Particulars of Cub.—Weight, 17 lbs. Length from nose end to tip of tail, 26 in. Girth round chest, $16\frac{1}{2}$ in. Girth round belly, $19\frac{1}{4}$ in. Distance between base of ears, $4\frac{1}{2}$ in. Length of fore-leg from top of shoulder to end of middle claw, $10\frac{1}{2}$ in. Length of fore-paw, $3\frac{1}{2}$ in. Length of hind-foot, $4\frac{1}{2}$ in. Length of middle claw (exserted), $\frac{3}{4}$ in. Length of thumb claw (exserted), $\frac{1}{4}$ in. Neck circumference, 11 in. Head length from nose to occipital protuberance, 7 in. Circumference of head in front of ears, 13 in. Nose length, $1\frac{1}{4}$ in. Eyes open and pupils respond to light. Body hairs $1\frac{3}{4}$ to 2 in. long, very white and even.

Dentition.—Canines upper and lower both through. Length, $\frac{1}{2}$ in. upper; $\frac{1}{3}$ in. lower. Incisors. Lateral upper through. Middle of upper and all lower were just below the mucous membrane on the point of coming through.

Particulars of Lair.—Total length, 15 ft. 10 in. Width at end below breathing aperture, 6 ft. 4 in. Width at middle of hole (waist), 3 ft. Depth at breathing-hole end and at waist, $1\frac{1}{2}$ ft. Width at base (end away from breathing hole), $1\frac{3}{4}$ yards. Depth at base, $2\frac{1}{2}$ ft.

The roof of the lair was claw-marked (striated), and quite free from the feathery icicles which hung from the roof of the breathing aperture and from the end beneath the shaft going up to the breathing-hole to the waist of the hole for $7\frac{1}{2}$ ft. Icicles on roof at the above portion of the lair about $2\frac{1}{2}$ to 3 in. long and $\frac{1}{2}$ to $\frac{3}{8}$ in. in diameter. There was three and a half feet to four feet of snow from the roof to the surface of the drift.

Washed my clothes during my watch from 10 P.M. till 2 A.M., which is an operation carried out under considerable difficulties in this part of the world, owing to the trouble in obtaining water; and it is small wonder that our clothes soon began to look very yellow. We were all weighed again to-night. All much as before.

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Weather: Light S.E. airs and winds to 4 A.M. At 6 A.M. light S.E. airs. At 8 A.M. W. airs. At 10 A.M. and noon calm; light airs from W. by N., W.N.W. till 4 P.M., and then till midnight light N.W. airs and winds. Overcast, cloudy weather throughout. Atmosphere clear near the earth, great quantities of circo-cumulus roll cumulus clouds, and in the early morning.

February 5th, Tuesday.—Went out with the dogs on my usual sport-seeking (or shall I call it food-searching) walk. I came upon a walrus making blow-holes in the thin bay ice between the thicker bay ice and the floe pieces that have come in and now cover the western portion of the recent open water in that direction. He was lying on his back beneath the ice, and hammering and scraping at a small hole he had made, and gradually enlarging it. I walked up close to him, and could have taken hold of one tusk which projected through.

The marine barometer now registers 31.25 (uncorrected for sea-level), and the aneroid in the house has now risen over one-tenth past the thirty-one inches (past the scale), so that neither can be read exactly. This being so unusually high, I have had both photographed lest doubt should be thrown on these readings. A bear came to the ship at 8 P.M., but was scared by Sunding. One of my men and I went in pursuit, but failed to find any trace of him. "John" came up at eleven o'clock to say that the dogs were barking to S.S.W. of the ship some distance off. I went about two miles away in that direction, and found the dog "Sammy" in great trouble. He had apparently got on the wrong side of an open crack with water in it, and was afraid to cross it. He no doubt had been returning from chasing the bear seen earlier in the evening. My presence seemed to give him confidence, for he jumped over on my calling to him.

Weather: At 2 A.M. light N.W. wind. At 4 A.M. gentle N. by E. wind. At 6 A.M. gentle N.N.E. wind. At 10 A.M. moderate E.N.E. wind. At noon light N. by E. winds. Light airs and winds from E. by S. at 2 P.M. Calm till 10 P.M. At midnight light N.N.W. wind. Overcast and cloudy weather until 11 A.M. Fine clear weather until 4 P.M. Especially clear and cloudless until midnight. All the barometers, except George's, too high to read. Barometers began to fall about midnight.

Aurora.—At 6.20 P.M. a brilliant auroral display. Commenced by rising in E.N.E. and moving slowly through S. to W. Pale yellowish-green color. At 8.30 P.M. it shot across heavens at altitude of 80° to N.E. in

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about five seconds. Coloring prismatic, rose, green, and yellow, recurring in another band through N. across to W. at altitude of 60° , then it lost its prismatic coloring and became straw-colored or yellowish green. At 6.34 P.M. band from W. to N.E. moved like shooting flames, laterally and swiftly, without losing its formation or shape. At 6.37 P.M. band W. to N.E. moved with a rapid serpentine movement. At 6.40 P.M. band W. to N.E. appeared to rise up into space and moved to zenith in S., losing all color, and becoming like white smoke or soft, white, filmy, ethereal clouds. At 10 P.M. auroral sub-corona in zenith with streamers to N.E. through E. and S. to W. A few patches at 40° altitude to E.

February 6th, Wednesday.—Another rise in temperature, and snow. A northwesterly wind blowing. Had previously been cold from this quarter. The reason of a northwest wind causing a rise of the thermometer now is not easy to understand, unless there is open water to northwest of Gillis Land, and even then the wind has to cross a glaciated country to reach here, which would relieve it, one would expect, of all moisture, but might produce a föhn wind. Can there be only a small amount of land in that direction? I hope not.

Our infant bear to-day was photographed by magnesium flash-light in the hut. Much open water to the westward and eastward of Bell Island. Crowther says there was none of this open water at this time in 1882. The frost-bites on my thighs are still very troublesome; are dark and swollen, and very hard and knotty, suggesting a large bruise in appearance. The doctor has prescribed a lotion of belladonna and goulard water to apply, as he thinks that it may develop into an ulcer owing to the stoppage of the venous circulation in it. One place is about three-quarters the size of my hand; the other smaller. These bites occurred on January 26th, when searching for the lost dogs.

Weather: At 2 A.M. light N. by W. wind. At 4 A.M. gentle N.W. wind. At 8 A.M. light W.N.W. wind. At 10 A.M. gentle W.N.W. wind. At noon light W.N.W. wind, then till midnight N.W. wind, varying between light airs and gentle winds. Fine, clear weather till 4 A.M. It then clouded over and became overcast for the remainder of the day. At 8 A.M. cirrus clouds moved rapidly from N.W. Five hours' snow. At 6 P.M. double halo round moon, the inner halo being nearly of the same as the moon, with a border of brown yellow; the second or outer halo of a deep green color, with a border of reddish yellow. The moon itself appeared misty.

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February 7th, Thursday.—I received the following report from the doctor in reference to the only dog that has died or suffered from illness since we had them, except, of course, those that have been killed by the others of the pack :

"ELMWOOD, CAPE FLORA, FRANZ-JOSEF LAND, *February 6, 1895.*

"*F. G. Jackson, Esq. :*

"Sir,—As a dog which died on January 12th last has been the only case of illness among the dogs which has occurred since leaving Kharborova, I take the opportunity of reporting upon the probable cause of his death. Ever since the dog came under observation he was noticed to be an ill-conditioned cur, keeping himself aloof from his fellows, and of a skulking disposition. He was a particularly filthy feeder, preferring garbage to food given to him.

"After the kennel was erected he was shut up in it. These beastly habits in all probability caused a skin disease, which consisted of rose-colored spots (not many) and loss of hair about his abdomen and under parts, also to some extent on his legs, so that he was more exposed to the cold than he would otherwise have been. On the day in question (January 12th) he was found to have broken out of his kennel, and was lying on the cleared space near the observatory in an epileptic form of convulsion, with tetanic spasm, on the point of death, for he died within a minute or two, the probable cause of which was the exposure his condition subjected him to. Not knowing whether his disease was infectious, and to avoid contaminating his companions, we buried him deep in the snow and away from where they would be likely to find him. I examined the other dogs later, and am glad to say that none of them seem to have any disease upon them.

"I have the honor to be, your obedient servant,

"REGINALD KOETTLITZ, M.R.C.S., Lon., etc."

CHAPTER VII

A TOUGH BIT FOR "MR. BEAR"

February 7th, Thursday.—At 2 A.M., as I was coming off my watch, I heard dogs barking at a distance to the west-southwest of the ship. Took my .303 rifle and started off, expecting that a bear was the cause of the commotion. The snowy and misty weather made walking over the rough floe very tiresome work, and caused frequent falls. After going about two and a half miles to the edge of the open water (now covered with a skim of bay ice), I found the dogs barking at a walrus lying on an ice spit surrounded by thin bay ice. As it was quite impossible to take him in such a position by such a light, being quite dark and misty, I called the dogs off and got back to the hut at 4 A.M. At 5 A.M., just as I was on the point of turning into my blankets, I heard the dogs again barking, so I hurriedly put a coat and a pair of breeches over my pajamas, and slipping on a pair of finsko boots, started off again with my rifle, going in the same direction as I had earlier in the morning. The light was very bad, owing to snow and mist in addition to the ordinary darkness of night. After stumbling about two and a half miles to the west-southwest, guided by the barking, I came upon a bear close to the open water, with the dogs yelping around him, and he roaring and making dashes at them. Going up to within ten yards of him, I wounded him badly in the lower portion of the neck, but unfortunately not sufficiently to stop him. He reluctantly took to the water, but as it had a thickness of an inch of bay ice upon it, and consequently difficult to swim through, on my hiding behind a hummock of ice he came out again farther west, and started across the floe at a good pace towards Miers Channel. The dogs and I followed, giving chase; he was bleeding considerably all the way. Every now and then he would stop to rush at one or other of the dogs, which, however, managed to dodge him.

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As he appeared to be distancing me and I was getting blown from running, I fired a shot at about sixty yards distance. Whether it hit him or not I can't say, but it had the effect of making him head back again towards the open water. As I had started out in haste with only three cartridges I had now only one left, so that on coming up with him again at the edge of the floe, I was particularly anxious to make sure of a fatal shot. I found him about thirty yards from the water which was covered with very thin ice, giving vent to suppressed roars and making rushes at the dogs as they barked around him. Wishing to make certain of him I went up to within six or seven yards of him, when he rushed at me, at first with his head low down, at which I fired; but just as I did so he threw his head up, causing the bullet to go between his fore-legs, and he came on at me with a regulation menagerie roar and his mouth wide open, and in a second he was upon me. I could feel his warm breath upon my face, could see the gleam of his teeth and the shape of his long gray tongue, and the furious glare in his savage eyes. I had just time to remove the rifle from my shoulder, half dazzled as I was by its flash in the darkness, and to thrust the barrel with all my force into his open jaws, and then drew it back for another thrust. This was a trifle too much for him, apparently, as he whipped short round and took to the water, covered with thin ice as it was. My left hand, which entered his mouth up to the wrist, as shown by the teeth-marks upon it, bled a good deal, although the wounds were little more than deep scratches. I had now to reluctantly throw up the chase for the present, and started back to the hut for some more cartridges, although I would have given £10 for another cartridge then, for I could have killed him easily. By the ship I met Child, who had come on watch just as I went out, and whom my having been away for two hours had made anxious. I sent him up to the hut with my .303, to bring my double-barrelled .450 Henry rifle in its place, for I considered that as I had rather a dangerous fellow to deal with, it would be as well to have a second barrel up one's sleeve in case the first failed to kill him. I then started off back to the scene of my late hunt, followed by Child and also the mate, who had come out on deck, and who insisted that I must not go alone. I found that the dogs were still barking at him from a distance, but that he had forced his way across the practically open water

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through the thin bay ice, and was now on a floe on the other side, about one hundred and fifty yards off or less, giving vent to low roars, but, alas! quite out of further harm's way. There I had very reluctantly to leave him, as there was no means of approaching nearer to him. He was a good game bear, and I hope may recover from his wounds, but I fear there is no chance of that. I have the greatest possible dislike for wasting life, and an even greater one to leaving a wounded animal to die; but in this case it was quite unavoidable, although it went to my heart to do so.

On getting back to the hut at 8.30 A.M. I bathed my hand and turned into my blankets. After breakfast I found that the barrel of my .303 rifle was covered with blood, and on measuring it found that it must have entered the bear's jaws to the extent of twenty-three inches and have considerably damaged his throat. I shall always keep this rifle, for it certainly saved my skin for me. It was a near squeak. The bear was a huge fellow—quite as large as any I have seen. I sent Child, Fisher, and the doctor at mid-day to take advantage of the twilight to see if it can be seen from the point where I had left it, as a west or southwest wind would drive the floe he was on against the fast ice on this side, and enable us to reach him. They, however, managed to go wrong, and Child got a ducking through stepping on to some thin bay ice. I mean to go and look myself to-morrow, for I feel distinct respect for this gentleman, for he is a fine plucky bear, who fights his battles in the open in a very different manner to some of his inferiors of the human family who do not; but I fear that the northwest winds will have driven the floe away.

The bear cub is a source of great amusement. She cries exactly like a young infant, and in many ways behaves like one, but shows much vice by biting and scratching. She hisses and growls very much like her elders of that ilk, and sometimes, when going off to sleep in a contented frame of mind, makes a noise like the propeller of a small steam-launch. Child has become its foster-mother, and has tried a variety of home-made teats (teats were not included among the polar equipment), but it will have none of them, and its feeding resolves itself into pouring condensed milk down its throat. It is an unfeminine little animal, and its conduct generally anything but ladylike, sorry as I am to say such things of our foster-child.



"EVIDENTLY CONSIDERING THAT SHE HAS QUITE REACHED PORT, AND THAT HER LITTLE BEARSHIP'S TROUBLES ARE ENDED."

A TOUGH BIT FOR "MR. BEAR"

I hope to send her home by the *Windward* to the "Zoo" in London.

February 8th, Friday.—Went across the floe to the open water to see if I could see anything of the bear, but I found that all the thin bay ice had gone, and the floe he was on had disappeared from where it was.

I hit upon a fortunate idea for a teat for our adopted baby, which is a small piece of sponge covered with chamois leather, and with an india-rubber tube running into it from a bottle, and a piece of glass tubing fixed in the cork, into which air can be blown to make the milk run freely. She takes this very readily, and sucks away in a most ravenous fashion, with a contented, grateful look on her face, evidently considering that now she has quite reached port, and that her little bearship's troubles are ended.

February 9th, Saturday.—I slept outside on the roof after my watch closed at 2 A.M., to try the altered sleeping-bag, the temperature being 35° to 42° below zero, and a strong breeze blowing. I found that the hood to it is not quite up to the mark yet.

The minimum thermometer in the screen registered 45° below zero to-day.

February 10th, Sunday.—After my watch ended at 2 A.M. I slept on the roof to try a reindeer-skin rug. The thermometer was at 37° below zero. I found it unsatisfactory, as it got as stiff from the cold as a sheet of galvanized iron, and I could not wrap it round me, and I spent a very chilly night in consequence.

I send all the members of the expedition on the floe at noon for a good walk, and Armitage and I also went to-day towards the edge of the open water, pulling behind us a semi-roasted leg of a bear to act as a drag, in the hopes that it may bring bears up to the hut. As we dragged it to the door on our return I remarked to Armitage: "We shall have a bear walking in at the door now." Next day my prognostication was almost realized.

Armitage and I took lunar observations for longitude, consisting of forty-six separate observations. The time taken to do this was one hour, sixteen minutes. The temperature at the time was 36° below zero—making handling instruments rather cool work. The oil in the lamps (half paraffin and half bear's oil) kept freezing and gave us much trouble. It is not an unmixed joy, taking astronomical observations in these latitudes during the

A THOUSAND DAYS IN THE ARCTIC

winter. The instruments get frosted over with our breath, dimming the scales so as to render them all but unreadable, which by the dim light of a lamp are never too distinct. The cold becomes more and more penetrating, and we leave off for a few moments to stamp up and down and swing our arms to coax back the blood to our frozen feet and fingers. We have to work in mitts, too, which render difficult the manipulation of the fine screws and adjustments. People hear of observations being taken in the Arctic, but little realize the conditions under which those observations are frequently taken.

Weather : Light N.E. airs and winds till 10 A.M. At noon a gentle E. wind. At 2 P.M. calm. At 4 P.M. a light E.N.E. wind, and from then till midnight calm. Fine, clear weather throughout. At 8 P.M. auroral arches from E.N.E. to W.S.W. of varying altitude to 60° arched towards zenith. At 10 P.M. corona in zenith, with streamers radiating from it around heavens, and bands near horizon at S., S.E., and S.W.

February 11th, Monday.—A bear came up to within a couple of yards of the door at noon to-day, just after all the members of the expedition (except Armitage, Burgess, and I, who were just starting) had gone out on the usual walk. Burgess was on the point of leaving the hut when he saw him just outside the door, and just had time to slam it. I went out with my .450 double rifle and in a second had put a bullet into him. We found him on the top of the snow-bank about eight yards from the house on the southwest side. He fell, and lay there for half a minute nearly, when he staggered to his feet and made off, followed by the dogs, which had been absent somewhere until after I fired. I called to Armitage, who had now joined me, to put a solid government .303 bullet into him, as I wished the effect tried. (The effect was *nil* so far as stopping him went; but I afterwards found that the bullet only passed through the flesh of the right thigh and out again.) As he went over the fresh-water pond I gave him one in the left flank, ripping it up and fracturing the left shoulder; but still on he went, bleeding profusely, and scrambled down the steep icy slope towards the floe, he and the dogs getting mixed up into a confused heap on the way down (a lucky thing for the dogs he could not bite—my first shot, I found, prevented this by breaking his jaw). On their separating a little, I put two more bullets into him and finished him. He was



INFANT CONTENTMENT AFTER DINNER

A TOUGH BIT FOR "MR. BEAR"

a moderate-sized he-bear, weighing 750 lbs.; length along belly, 7 ft. 9 in.; along back, 7 ft. 5 in.; girth of chest, 6 ft. 1 in.; round neck, 43 in.; width between the ears, 1 ft. 2 in.

Polar bears appear almost insensible to shock, and have evidently a low nervous organism; to stop them it is necessary to hit some spot, such as the brain or vertebræ, that will absolutely put their locomotive machinery out of gear, otherwise they go away smiling. The first bullet entered two inches below the left eye, fracturing considerably the left side of the lower jaw, driving small fragments of it into the throat, two of which were found in the stomach. It then passed backward and inward through the root of the tongue, fracturing the hyoid bone, carrying away the left half of the epiglottis, and then travelled backward and downward into the larynx, fracturing the cartilage and several rings of cartilage of the trachea, making a large jagged wound in it; then it ploughed through the muscles in front of the bodies of the cervical vertebræ, and a piece of the bullet was found embedded in the muscles of the fifth vertebra. He also lost a large quantity of blood, some of which ran down into the lungs. And yet, after he had recovered from the stunning effect of the blow on the angle of the jaw, was going gayly off! In the neck, at the base of the skull, is the best place to shoot a bear if you have the chance of putting it in at this spot; through the brain is safe enough, but it makes a smash of the skull. The drag we laid yesterday apparently brought him up. We are very glad of the meat. Armitage and I took out another to-day when out for exercise. We saw several walruses in the open cracks in the bay ice.

Photographed the infant bear (by flash-light) to-day, having its bottle, and also while playing with its toes afterwards, much like a human baby. We found on weighing it to-day that it has lost $3\frac{1}{2}$ lbs. since its arrival. This is hardly surprising considering its change of milk and its semi-starving condition until a suitable teat could be devised. A dog in the kennels died suddenly to-day. It was quite well at 1 P.M. and ate two and three-quarter dog biscuits after that time, but was frozen stiff at 3 P.M. There is no apparent cause of death, but I have requested the doctor to make a post-mortem examination of him. I am very particular indeed about having all water boiled before being used for food or drink, as some of the dogs have tape-worms. I also have all

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- tinned food carefully examined before being used. These points I consider to be of the very highest importance.

February 14th, Thursday.—I was called at 8 A.M. to hear that a bear was near the ship, as the bell was ringing. A minute or two afterwards Blomkvist came up with a rifle to report it to me. I put a coat and breeches over my pajamas, and Armitage and I started off with our rifles. We found the bear on the south side of the confused pile of floe-bergs and ice-bergs at the point. He and I then separated, he staying on the west side and I going round to the southeast so as to cut off his retreat. The bear on seeing me crossed the floe-bergs, and passing within twenty yards of Armitage, received a shot in the neck as he went by, but without stopping him; I followed up with another at a long range which missed. The bear, bleeding a good deal, made for the stony point to the northwest of the ship, about three-quarters of a mile off, followed by the dogs. Armitage, who had a good three minutes' start of me, came up with him there among the large bowlders and killed him, I catching them up half a minute later. It was blowing a stiff breeze from the north, with hard driving snow, and not enough light to see one's rifle-sights. The wind, snow, and a temperature of 15° below zero made running to windward very blowing work.

February 15th, Friday.—I experimented with some government cordite and also some rifleite .303 cartridges to-day, which had been exposed under the thermometer screen all the winter to the cold. The temperature at the time of firing was 25° F. below zero. I used the government rifle, sent for me to experiment with, at twenty yards' distance, the target being a one-inch plank, then a sack of oats five feet in circumference and thirty inches high, then a pine board three and a half inches thick, and then another similar sack of oats with another one-inch pine board behind it. I found all the regulation bullets passed through the one-inch board and sack of oats, and lodged in the three and a half inch pine board about one inch from the surface in a broadside-on position; only one passed through it and penetrated the second sack of oats. All the nickel bullets turned broadside-on after entering the first sack of oats. I also at the same time tried some of the regulation cartridges which had been in the hut all winter, and could detect no difference in either the firing or the penetration, or in any other respect, between these and the ones exposed



BEAR-DOGS AND BEAR

A TOUGH BIT FOR "MR. BEAR"

to the weather. The bullets were quite unaltered after entering the target, the only marks upon them when recovered being those of the rifling of the gun. I found the bolt of the gun pull back stiffly, owing to the cold. The sight-protector also is difficult to remove after exposure to cold. The striker, now that oil has ceased to be used on it, acts very well, and the rifle now never misses fire, as it did in cold weather when the striking mechanism had been oiled. The greatest cold these cartridges had been subjected to was fifty-four below zero. I am sending a report to the War Office, as requested by them.*

Some of the expedition when walking on the floe came upon a bear about half a mile from the ship, and although they had a rifle with them they at once ran back to tell me, like the good fellows they are. One man and I started off with the dogs, followed by the members who had seen it, but although we searched for three hours, hunting the floe edge by the open water from west to east, we could not meet him. I think he must have taken to the water. We saw several walruses at the floe edge.

At the ship they are working up an idea of mine for improving the pony's snow-shoes—the Norwegian ones appear to me very primitive affairs, and will not stay on.

The doctor held a post-mortem on the dog that died a day or two ago, and I have told him to send me in a written report upon it. He found tape-worms in the intestine, and I have asked him to examine and experiment with the eggs of them, with a view to ascertain what degree of cold, if any, destroys them. We have been very careful indeed all along in having all water thoroughly boiled before being used, to avoid the risk of contracting hydatids from this cause, as it was evident that many of the dogs have worms. This dog probably died of convulsions caused by them.

February 16th, Saturday.—Blowing a fresh gale with a temperature of thirty-two below zero from east-by-south and east-southeast—distinctly cool. There is evidently no open water down that way now. The fine snow from the glacier is driving in the wind. I sent the members of the expedition out at noon as usual, but with their "militzas" on. Two or three returned

* I have since sent a written report on my experiments with the rifle and ammunition to the War Office, which I am pleased to hear from the officials there have had valuable results.

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at lunch-time with their faces touched up a bit with frost-bites. Armitage and I went out for a walk also. I brought Heyward back, who, unable to control his delight at having a rifle all to himself, had started off alone, picturing to himself slaying a bear all on his own account. He had walked over the floe with his back to the wind as far as he thought time would allow, and then had all the way back to come against it. Seeing him at a distance in evident distress and unable to make headway, I bore down upon him and brought him up. He had got both cheeks considerably frost-bitten, and looked very pretty indeed. It has, however, taught him a lesson that weather like that of to-day is to be respected, and is not a huge joke, as he had evidently imagined it to be.

February 18th, Monday.—We find on weighing the bear cub to-day that it has gained one pound during the last week. "Sammy" and "Nimrod" turned up about 2 P.M.—they had got on the wrong side of an open lane of water, which had parted behind them, and we feared they had come to an untimely end. No open water is now to be seen from a height of fifty feet, for the first time this winter. Where open water was a day or two ago is now filled up with a mixture of bay ice from two inches thick to floes eighteen feet thick and more, which is constantly shifting with the wind and tide. All the ice I crossed while after the dogs yesterday has entirely changed, and at some points the pressure has been tremendous. While out to-day one of my men and I had just time to cross a crack before it opened to twelve feet across while we watched it. The ice on either side of it stood three feet on the flat, and much more where it passed through hummocks, above the level of the water. Piles of huge blocks of ice were heaped up to heights of twenty-five feet, and heaps of twenty feet had formed since 4 P.M. of yesterday. No ship that ever was built would stand the pressure exerted, if she got fairly in the jaws of it, and the floes would in a few minutes place her either on the top of them, if she should rise to it, or else underneath them; or go clean through her sides if they got a fair grip of her. The ice here has been squeezed against the land, which very much increases the pressure. All this shifting ice has come from the east, possibly from the Kara Sea, brought in by the late easterly gale.

We have been busy taking out the double windows and re-

A TOUGH BIT FOR "MR. BEAR"

moving ice (two inches thick) from between them, which was formed owing to damp air having passed between them from the room, caused both by defective calking when they were put in, and also through breakage of the inner windows and repairs by brown paper during the winter.

Now that we shall be having the sun back in four days we want to take full advantage of all the light we can get, for we quite appreciate light after the darkness of the Arctic night. Four months of solid night has a depressing effect not only on the spirits but on the appetite, and even during the first winter it seriously affected the sleep of more than one of the party. Morning, noon, and night become unrecognizable, merged into one endless gloom, and but for the welcome advent of the moon once a month, when the sky is sufficiently clear for us to enjoy her rays, we have lived in a darkness the dreariness of which is indescribable. As the school-boy counts the days to the holidays we have counted the hours till the return of the sun, and even as the first rays become visible our spirits rise, and existence altogether wears a different complexion. Now exercise becomes enjoyable, and instead of the dreary daily trudge round a given circle in the darkness, with the return of the light we feel new life and energy. They say eels get used to skinning. Well, we may have got fairly used to darkness, cold, wind, mist, and driving snow, but we hardly like it.

February 19th, Tuesday.—Busy repairing the windows and removing the two inches of ice which is caked over them.

Went my usual bear-hunting walk with the dogs at noon, taking my rifle now, as I find from experience that too much time is lost in returning for it after finding a bear. Could see frost-smoke arising from pools of open water to the south and S.S.E. The sky showed evidence of considerable open water to S.S.W. I could, however, see no water (altitude 50 feet), so it is probably eight or ten miles away.

About 5 P.M. Smith, the second engineer, came up to say that the dogs were barking out on the floe just beyond "Bear Corner." A man and I started off with our rifles, but could only just hear the barking of the dogs rapidly going away in the distance towards the south. We followed in the darkness across the floes until we had gone at least two miles beyond Cape Gertrude, but never could get any nearer (evidently something had badly

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scared the bear) until their sounds ceased entirely, and one by one, after our waiting and whistling for some time on the top of a heaped-up pile of ice-blocks, about half a mile from one of the open pools of water seen in the morning, they returned. My little Samoyad bitch "Sally" was very wet, having evidently fallen into a crack. My other little bitch, "Jinnie," gave birth to seven pups at noon to-day—quite a sledge team! I had fortunately installed her in a box of hay in the hut only a few hours before. She was extremely desirous of going out with me shooting as usual to-day, and looked very crestfallen when sent back to her domestic duties. The temperature throughout the day until to-night has ranged from 40° to 46° below zero. The minimum thermometer in the screen indicated as low as 50° below zero. I, however, got quite hot in this temperature during my run after the bear, my face getting coated with ice owing to the perspiration freezing on it, and on my removing my cap to better enable me to listen for the barking of the dogs, my hair froze quite hard in about twenty seconds. It was, however, beautifully calm and clear. A local breeze coming from the gully to the west of Cape Gertrude made the cold for a time very unpleasantly evident, plainly reminding us of the difference a little wind would make.

Weather: Light airs to gentle winds from E.S.E., E. by S., and E. to 10 A.M. Calm till 10 P.M. Light E. airs at midnight. Fine clear weather throughout. At 2 A.M. a disconnected auroral band from W.S.W., altitude 5° to zenith. At 4 A.M. bands and streamers from W. to zenith. Patches in S.E. and E. At 8 P.M. a regular arch N. to W.N.W. at altitude 60° . At 10 P.M. a broken auroral band E. to N.W. across zenith. Streamers at W., altitude 50° . At midnight band N.E. to S.E.

February 20th, Wednesday.—Armitage and I walked out on the ice with the dogs to beyond the cleft berg, nearly half-way to Mabel Island—all open water has disappeared in that direction. The temperature at 45° below zero, with a breeze from the east, made it rather cool when returning. The minimum spirit thermometer registered at night 51° below zero. I am hurrying on our preparations for a start north.

Weather: At 2 P.M. light N. airs. At 4 A.M. S.E. airs, increasing to gentle breeze at 6 A.M., shifting and decreasing to light E. wind at 10 A.M. E.S.E. at noon. Calm from 10 P.M. till midnight. Fine clear weather

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throughout. At 2 A.M. a regular auroral band across zenith from E. to W. At 4 A.M. band from S.W. to N.E. Also band across sky S.E. to E. about altitude 25° . At 8 P.M. brilliant aurora, a circular base, altitude 15° , with streamers shooting up to common focus bearing S., altitude 70° . Band running from base from S. to W., and streamers from it making for a common focus and formed a corona in zenith which broke up at 8.15 P.M. into numerous serpentine bands and arches all over heavens. At 10 P.M. a broken band to S.W., altitude 10° , and short streamers rising from it to altitude 30° .

February 21st, Thursday.—Put up the Willesden canvas tent on the ice of the pond. It appears likely to act all right.

Armitage and I did a little revolver practice at noon, and afterwards walked some distance to the glacier leading to Shell Gully to see what our path north looks like, as that is the way by which we shall go. Found a breeze blowing there, which made the temperature (47° below zero) felt. The mercury in all the thermometers has been frozen solid for the last few days, and the minimum spirit thermometer has registered 54° below zero at noon to-day for the last twenty-four hours. Water has opened up to the east of us in a position in which I have never seen it before all the winter. It has been calm most of the day, with the exception of the local breeze from the northeast we met with on the glacier. Sounds could be heard at a considerable distance to-day, and intense cold apparently does not reduce the travelling of sound, so far as distance is concerned; it may in velocity perhaps.

When on the floe over a mile away, Armitage and I could hear members of the expedition talking in an ordinary tone when near the hut, and could distinguish what they said—a possible echo of the rocks behind them may have had something to do with this long carry of sound, as they did not hear my whistle, which I blew to test this.

Weather: At 2 A.M. calm. At 4 A.M. light E. wind, and from then till 6 P.M. calm. At 8 P.M. light N.N.E. wind. At 10 P.M. a moderate N.E. wind. At midnight light N. by E. airs. Fine clear weather throughout. At 8 P.M. auroral bands from E. to S., altitude 5° to 15° .

CHAPTER VIII

DAYLIGHT RETURNS

February 22, 1895, Friday.—The long Arctic night came to an end to-day, and the sun rose for the first time since October 18th. The upper limb (refracted) appeared above the horizon at 10.29 A.M., and remained above for about three hours. We are mightily glad to see it back again—we can now get to work soon.

At 2 A.M., after my watch, I slept out in the tent we have pitched upon the pond in my "militza," "soviak," and "pimmies," to test this night-rig as compared with the various modifications of the reindeer-skin bag. The temperature in the screen stood at $39\frac{1}{2}$ below zero, so it was a fair test. I found the result satisfactory, excepting that my "soviak" is too tight around the throat and nearly choked me, making me almost afraid of going to sleep for fear of this really happening in the event of my turning over.

The juvenile bear is now taking three pints of milk (half a tin per day), making fearful havoc with our supply. It is to-day, however, within half a pound of its original weight, and is much stronger than it was then. It is getting a very rowdy, truculent little beast, and when in a bad temper turns the hut into a perfect pandemonium of sound.

Weather: At 2 A.M. calm. At 4 A.M. light N. by W. wind, and from then till noon light N.E. wind. At 2 P.M. calm. At 4 P.M. moderate N.E. wind. At 8 P.M. fresh N. wind. At 10 P.M. variable winds. At midnight N.W. variable force. Misty till 4 A.M. Squally between 4 P.M. and midnight. Fine clear weather at other times. At 4 P.M. there was a sudden gust of wind from N.E. of force 4, and from then till 10 P.M. furious gusts of wind every one or two minutes between N. and E.N.E. and W.N.W. force 7 to 9, and from then till midnight between N.N.E. and W.N.W. chiefly N.W., forces 1 to 9. At midnight auroral bands and streamers in zenith E., W., and N.W.

DAYLIGHT RETURNS

February 23d, Saturday.—Blowing hard, with driving snow and very violent gusts, which carried away all movable articles and blew away part of the roof of the dog-house, which had withstood previous violent gales. I took mine and Armitage's "soviaks" down to the ship for Petersen to alter, having very considerable trouble in getting them there. The first time I started a violent gust blew me across the pond and separated



THE WINDWARD IN HER WINTER QUARTERS

my bundle, which I had strapped together. I managed to prevent the "soviaks" being carried off, but a reindeer-skin which was in the bundle and the strap were blown over the cliffs and on to the floe. The strap I recovered after half an hour's searching, but the skin had blown to kingdom-come, and is probably somewhere Cape Barents way. I brought the "soviaks" into the hut, and, having got another skin, managed to get them to the ship all right. This will give some idea of the force of the wind here when it sets to work to blow. The temperature was from 20° to 25° F. below zero, which made it pretty nippy. The members of the expedition did not go for their usual walk

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to-day. I was out most of the day, as I dislike very much being shut up, now it is light enough to get really good exercise.

February 24th, Sunday.—The gale had quite gone down by 8 A.M. this morning. We put the black pony into the sledge, and Armitage and I started off about 11.45 A.M. to make a preparatory excursion north to get an idea as to what the ice is like. We crossed the glacier between Capes Flora and Gertrude, and pushed across Gunther Bay until we were nearly abreast of Windward Island, where we stopped and took a round of angles with the prismatic compass, and then returned by the way we had come, reaching the hut at 6.30 P.M., having travelled about twenty miles. We found the ice with hard snow upon it and level, but deeply cut into furrows and ridges by the wind. The crust on the snow was often strong enough to bear the pony, which behaved very well. It certainly looks very promising for the future usefulness of these animals. I wish I had more of them. It has been a beautifully clear day and a great contrast to yesterday. The temperature sank again to thirty below zero towards night. The gale has opened up a good deal of open water off Bell Island, and to the southwest and S.S.W., about three miles from the ship.

We were all weighed again this evening. All had gained except Armitage and I. He has lost two pounds, and I seven pounds, since February 4th. This is due, with regard to him and me, to the amount of violent exercise and the many hard runs we have had after bears since the returning daylight enabled us to put the pace on. Some of the others are more deliberate in their movements and consequently longer in getting rid of superfluous flesh acquired during the Strasburg goose-life of the winter. I weighed 12 stone 12 lbs. to-night, Armitage 12 stone 5 lbs.

Weather: At 2 A.M. strong decreasing N.N.E. gale. At 6 A.M. strong N.N.E. wind. At 10 A.M. light E.S.E. wind. At noon gentle S.E. wind. At 2 P.M. till midnight calm. Overcast at 2 A.M. Fine clear weather for the remainder of the day.

At 4 A.M. streamers of aurora from N.E. to zenith. At 6 P.M. faint auroral band at E. At 8 P.M. thick arched fringe E. to W., at 20° altitude in the centre. Faint streamers shooting up from it and forming apex at zenith. At 10 P.M. a semi-corona in zenith with streamers radiating from it all around heavens with exception of between N.N.W. and E.N.E.

DAYLIGHT RETURNS

February 25th, Monday.—Armitage and I fixed the astronomical telescope on the roof of the house, to sweep the floes and to try and spot bears at a distance, for we shall be glad of more meat. The horizon, however, was rather misty, owing to frost-smoke rising. I sent the other members of the party out with a dog-team hitched to the English sledge, and also with a bay pony for exercise. Armitage and I then took the bear-dogs and went over the floes to the edge of the open water to look for a bear. We heard a walrus whistling in a peculiar manner, making a musical sound like a person blowing into a key. A flock of birds were seen flying over the open water. They were dovebies.

The captain came up at noon to say that Blomkvist and Manson are anxious to become members of the expedition party. As the former appears to be a tough, hardy fellow, I told the skipper to request him to write a letter of application and I will consider it. I can't take both. At 8 P.M. the dogs were reported to be barking as if at a bear, away west towards the rocky point. I started off with my rifle, Armitage following me about ten minutes afterwards, as he had to put his coat, etc., on. I followed the barking of the dogs away as far as the rocky point over the land; the sound then led me over the floe towards Bell Island for about two miles, and on to some thin bay ice, from which the bear finally took to the water and escaped, without giving either Armitage (who had come up with me by cutting across the half-circle I had pursued) or me a chance of a shot. It was a very dark night, unusually so for these latitudes, and I should have had to have got within ten yards of him to be able to make out the outlines of his body, to say nothing of his head, a thing he did not give me a chance of doing. We had a very rough, tumbling run over the hummocky floe, and we both had numberless falls. When returning, an aurora appeared in the eastern sky which gave some little light, probably owing to the unusual darkness. This is the first time that I have noticed the aurora have any perceptible effect upon the light; as a rule, it looks beautiful but makes no difference whatever to the gloom. The little bear has been very seedy all day. It was sick this morning, and has taken very little milk since. Something has apparently disagreed with its little stomach. The doctor has given it ten drops of chlorodyne and a table-spoonful of castor-oil. The former evidently relieved the pain in its "tummie" at once.

A THOUSAND DAYS IN THE ARCTIC

The poor little beast lay in my lap and looked a very pitiful little bear indeed before it had its dose.

Weather: Calm to 4 A.M., and from then till noon light E. airs and winds, and from then till 10 P.M. calm. At midnight light N.N.E. wind. Fine clear weather throughout. At 2 A.M. broad faint auroral band from S.S.W. to zenith. Narrow faint band N.N.W. to zenith. At 10 P.M. thick auroral fringe E. to S.W., at altitude of 10° scintillating and moving laterally to and fro, and sent up streamers to the zenith forming an apex. Streamers seemed formed in layers with fringed base, forming into thick circular masses. At midnight streamers from N. to S.E. Altitude 70° to zenith.

February 26th, Tuesday.—Our infant, the bear, is much better to-day.

Went for a walk for my usual bear-search along the edge of the bay ice at noon with the dogs. I found when trying to use my field-glasses, but owing to the cold the focus adjustment would not move.

Got out two sledges to rig up preparatory to our start north. I mean to do a preliminary trip with only two men to take on some fodder and provisions in a few days.

Armitage and I took theodolite observations of stars for time and latitude this evening.

February 27th, Wednesday.—I received a letter of application from Blomkvist. Maxim, the Russian, I find on questioning him, wants to get back to Archangel with the ship this summer.

Child at noon photographed "Bear Corner," the scene of many a good bear-hunt both by night and day, with Armitage and me and our four bear-dogs, "Räwing," "Nimrod," "Sammie," and "Sally."

Armitage and I afterwards carried out the plane-table to take a round of rays, and began to measure a base for the survey I intend to make, but the 100-foot tape broke, owing to the action of the frost (29° below zero with a strong breeze), and stopped us working for the day, for which we were not altogether sorry, as it was distinctly cool work.

Rigged my sledge in the evening. I have again had the trahometer altered. It is now almost entirely new.

Weather: At 2 A.M. light N.N.W. winds and from then till noon light N. and N.W. Calm till 6 P.M. At 8 P.M. moderate N.E. wind, and from

DAYLIGHT RETURNS

then till midnight fresh N.N.E. wind. From 10 A.M. till 2 P.M. observed long arches of cirrus clouds E. to S.W. meeting at horizon at each extreme. Altitude at centre 10° , colored dull gray, stone, fleecy white and reddish tints, the lines becoming much thinner as the altitude increased. (These have been observed frequently since this date, March 28th.)

At 10 P.M. short arched close auroral fringe of streamers of altitude of 15° E.S.E. to S.W.

February 28th, Thursday.—Blowing a fresh gale nearly the whole day : in the morning a whole gale. This, combined with a temperature of 25° F. below zero, made it particularly nippy. I went for a walk, taking the dogs with me, along the edge of the bay ice, finding less wind as I got away from the land, and consequently not quite so trying.

I rigged another sledge during the day. We are all, the crew included, very busy pushing on our preparations for the sledging.

The last day of the two-hourly observations. Through the spring and summer they will be taken at 8 A.M., noon, 4 P.M., and 8 P.M. only, as we cannot now find time to continue them two-hourly night and day.

March 1st, Friday.—Blowing and the snow drifting. We could do no more surveying on account of the wind shaking or carrying away the plane-table.

Armitage and I went for a walk on the floe with the dogs.

I went down to the ship to see how the various articles which are being made or altered for the sledging are progressing. I find that the painted outer canvas on two folding-tents will have to be removed and soaked in soda to remove all the paint.

I saw Blomkvist, and arranged to take him on as a member of the expedition : several of the crew are anxious to volunteer in the event of my not accepting him.

Continued our preparations for a start north.

March 2d, Saturday.—Blomkvist came up to the hut at 11 A.M., and the doctor examined him medically and reported him to be satisfactory, handing in a written report at my request. A fresh breeze with drifting snow still stops any surveying. Turned out No. 1 hut, removing the snow and rearranging the stores in it. Started weighing out the hay and oats with which to form a depot north. Rigged sledges, etc.

I tried the new pony-harness we have made with the black pony in the English sledge on the floe. Found it very satisfactory.

A THOUSAND DAYS IN THE ARCTIC

Maxim devoted quite ten minutes to first of all praising it, and then cursing his own Russian harness for being so clumsy. It was very funny !

March 3d, Sunday.—Still blowing and drifting. We continued the preparations for a start. In the afternoon I drove the black pony in the English sledge with Armitage on the floe round the point of Cape Flora as far as Windy Gully. At 8 P.M. all the crew except the watchman came up to the hut and spent the evening in whiskey, smoke, and song, giving three cheers for me on leaving at midnight. They evidently now take as keen an interest in the expedition, and are as wishful for its success, as we are ourselves. They have one and all behaved very well through the winter, and have not given me the smallest trouble.

Weather: Moderate E.N.E. throughout. Fine, clear weather. At 10 P.M. a regular auroral arch from E. to W.S.W. Altitude 20° and streamers from circular cloud-like patch at altitude 15° to 30° at E.

Double halo round moon. Inner halo yellow with border of brownish yellow. Diameter $1^{\circ} 36'$.

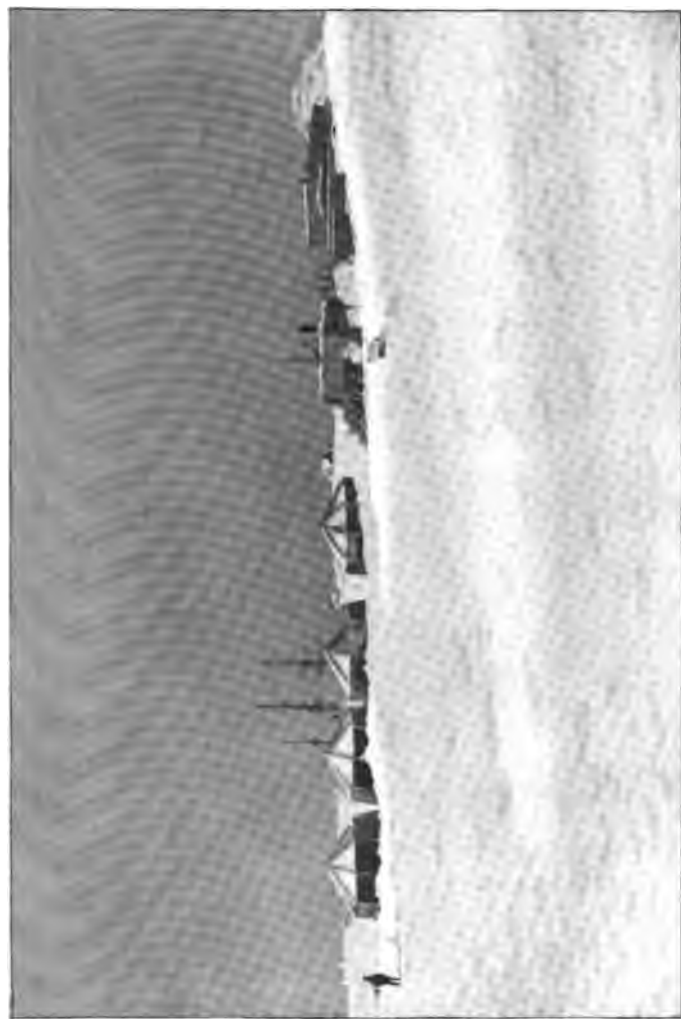
Outer halo of a dark green color with a border of dark brown, $2^{\circ} 36'$.

March 4th, Monday.—We have all been hard at work all day pushing on our preparations. I got one of the fodder sledges (11 ft. 6 in.) loaded (409 lbs.) and ready to start.

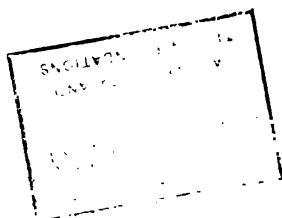
It has again been blowing too hard with drifting snow to go on with the survey. Armitage and I took an observation this evening of B. Tauri (which culminated with the moon) for longitude, and also observations at the meridian of the same star for latitude. We first up-ended the large Russian sledge, and lashed it to a corner of the observatory to protect the theodolite from the wind, and made a barricade around it ; it was, however, observing under difficulties.

March 7th, Thursday.—I had again to alter the tent stretchers. One of my men and I cleared out the pony stable and store, and I did a variety of odd jobs. Fine, calm but misty (fine snow), with parhelia around the sun. I find that many of the cartridges supplied for my Waigatz trip won't fit properly in my .303 rifle. They, however, go into the regulation rifle.

I tried the black pony in hobbles on the floe. Shall have to tether them in addition to hobbling them, I can see, as I fear otherwise they will travel in their hobbles at night, as there will



OUR SETTLEMENT, MARCH, 1895



DAYLIGHT RETURNS

be no pasturage to keep them feeding and occupied, as in more favored climes.

March 8th, Friday.—Armitage and I ascended Cape Flora to the top of the ice dome at the very summit. It being a beautifully clear fine day, we got a fine view for at least forty miles on sea-level, and could see elevated points much farther off. No definite open water visible of any extent, but about three to four miles off the ship, running east and west, a tract of mixed ice, composed of moderately thick ice, with bay ice between it, and with open lanes of water a quarter of a mile wide reaching to some distance off the shore, probably ten or twenty or possibly more miles. This is caused by the current. A second tract of disturbed ice joins the current track at right angles from the S.S.W., probably caused by the tide running in from the south.

Miers Channel appears quite free of lanes of water and the ice is very level, but a dark cloud hovering over the ice somewhere at the junction of Miers Channel with Nightingale Sound suggests the possibility of a large polynia there. Leigh Smith is evidently a little out in his map of Northbrook Island and the eastern side of Bruce Island, but I consider his mapping excellent. All the land so far as I can see is ice-capped with dark rocks forming headlands jutting out of the ice at long intervals. The "mainland" (Alexandra Land) is all ice-capped and rises to a considerable altitude until lost in the distance. Here and there dome-shaped hills rise upon it. All is one white expanse, one large glacier, and nunataks of rock jut out of the ice only near the shore at long intervals.

We found the height of Cape Flora by aneroid to be fourteen hundred and sixty feet. The ice near the summit is much crevassed; the crevasses being bridged with snow, which we had to cross by crawling over while lying on our chests. At other parts of the ascent we met with no cracks.

I addressed the members of the expedition to-night, remarking that they had now a little experience of the Arctic, have passed through a winter, and have a good idea now what their life in the future will be like. If any of them after their insight into life in this part of the world wish to withdraw from their engagement or were not entirely contented, now was the time to say it, and they could return with the ship. In a short time it will be too late! I gave them twelve hours to thoroughly think over it,

A THOUSAND DAYS IN THE ARCTIC

and required a written statement in reply from each member of the party.

March 9th, Saturday.—I received a letter from each member of the expedition by 11 A.M., stating their desire to continue members of it and to remain here.

At about 1 P.M. Maxim spotted a bear on the floe at some distance from the ship. In the mean time Mr. Bear, instead of coming towards it, struck off to the southwest. Armitage and I started off with our rifles to try and come up with him, he going east and I west, taking the dogs with us. They soon found him a mile still farther west, but he at once made off in the direction of Bell Island, and although I followed the line they had gone for four miles over the bay ice to the southeast of Bell Island I never got nearer to them, and finally the dogs and bear were lost to sight, and to hearing too. We want more meat now, and I shall be glad of a kill.

We completed our preparations and loaded up the fourth sledge to-night, and everything is in readiness for a start north to-morrow morning. The sledges are standing ready to go on the ice of the thaw water pond near the house.

The juvenile bear to-day ate some bear's meat and licked the plate on which it was with relish. It is developing rapidly, and can now bite with very considerable effect. It seized Armitage by the thigh to-day when crossing the room and considerably hurried his movements. It clammers all over the hut and won't stay in its cask for a minute unless the head be lashed on. The coal-box is its favorite play ground, and it is frequently more the color of its Russian relative than its natural straw-white.

The sledging party going to-morrow were weighed to-day. I have gained seven pounds since the last time we were weighed (February 24th), and Armitage three pounds (replacing fat with good muscle).

Our present weight is—K. Blomkvist, 13 st. 7 lbs.; F. G. Jackson, 13 st. 5 lbs.; A. B. Armitage, 12 st. 11 lbs.

The little bear has been stalking "Jinnie's" pups during her absence to-night, and got her fore-quarters into their box and proceeded to bite them, making them squeal, before it was noticed. A few minutes afterwards she endeavored to repeat the hunt, stalking them in the most orthodox manner of her elders, and was very angry at again being interrupted.



OUR HUTS IN SPRING

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DAYLIGHT RETURNS

March 10th, Sunday.—We left Cape Flora at 10.30 A.M. to establish our first northern depot and to get an idea as to what the track north is like. Armitage and Blomkvist accompanied me. We took two ponies drawing four sledges (one 13 ft. 6 in., one 11 ft. 6 in., and two 9 ft. 6 in.). The total weights drawn by the two ponies were 1700 lbs. (720 lbs. fodder and oats—two months' feed for two ponies) for depot, and 152 lbs. of provisions for three men (two weeks' provisions of three and a half pounds per day).

We carried provisions and equipment for seven days for men and ponies in addition to the stores for the depot. The sledge flags given to me by Mrs. Harmsworth and the Countess Metaxa were carried on the sledges, being taken down from the walls of my cabin the morning we left.

As we started cheers were given for us by the crew of the *Windward* and the remaining members of the expedition. The weather is clear, fine, and sunny, with a light breeze and looks most promising. Every one is most enthusiastic.

CHAPTER IX

THE FIRST SLEDGE JOURNEY, 1895

March 10th, Sunday.—For a long time past we have been very busy preparing for a preliminary journey northward. As the end of the dark time approaches all becomes hurry and bustle in our little community. The hut is crowded with all kinds of equipment and sledges brought into it to be packed, and piles of rations in the course of being weighed out fill every available foot of space.

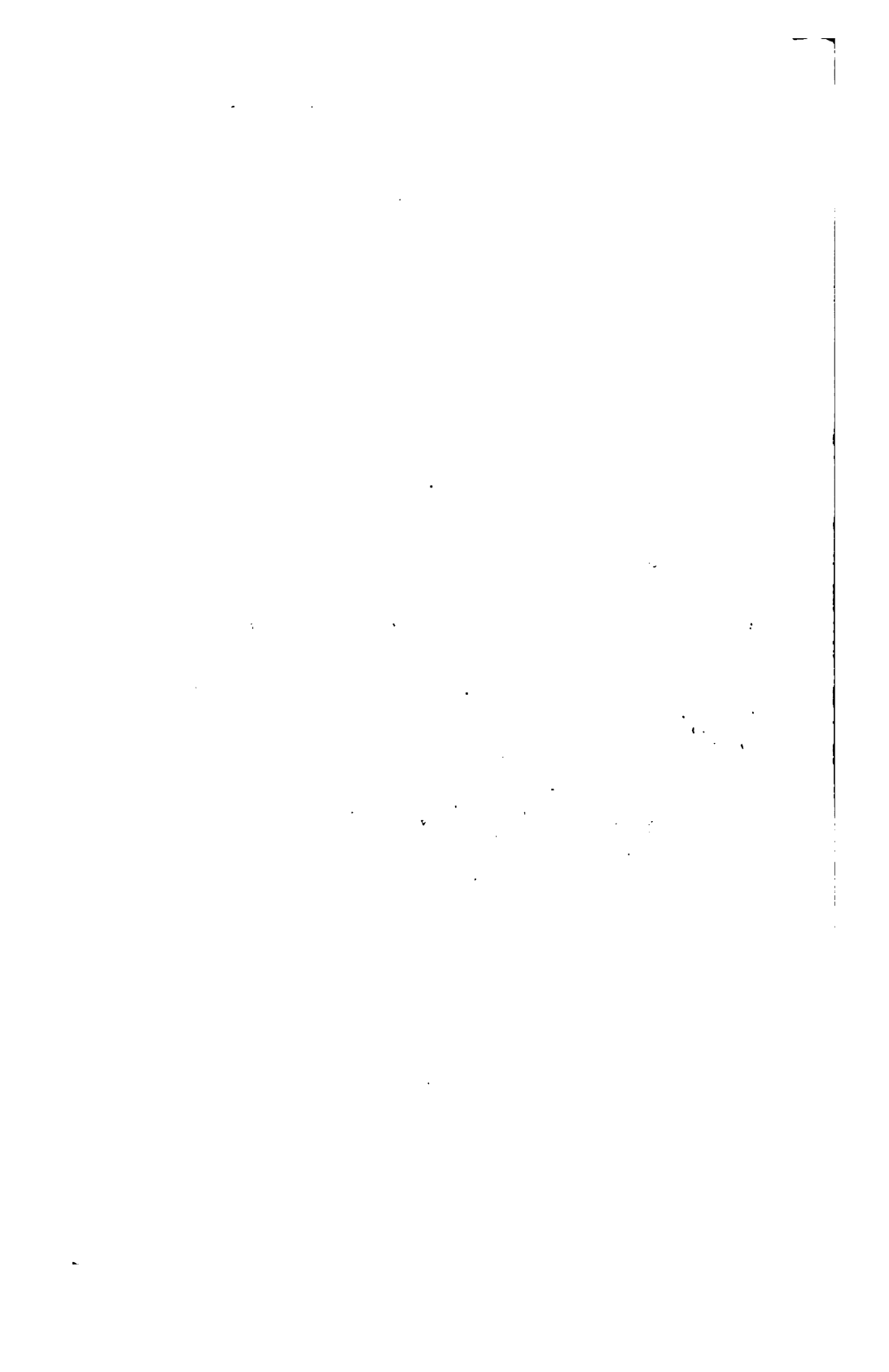
We have been working all through the winter at these sledging preparations, upon the careful completion of which so much depends. Weight and bulk are of the greatest consideration, and it is wonderful how weights accumulate by ounces, so that the utmost care must be exercised in the selection of only the most necessary and indispensable articles, and food rationed out to the smallest amounts per day compatible with keeping men in health. An amusing tale is told of a distinguished Arctic discoverer, who was said to have been found in his cabin carefully weighing a pocket-handkerchief and debating whether he should take it sledging or not! But it is only by careful attention to weights that good results can be attained, which the gentleman in question was one of the first to demonstrate.

One of my sledges I had constructed very much on the same lines as those by Admiral Sir Leopold McClintock, who most kindly lent me a model to work by. He is practically the Father of Sledging, and his sledges were as great an advance upon those of his predecessors as the modern Lee-Metford rifle is upon the old Snider.

The majority of my sledges were 9 feet 6 inches in length by 18 inches wide, and the bed of the sledge was raised 6 inches above the flat $3\frac{1}{2}$ -inch wide ski-like runners, and made of ash. These when quite dry weigh about 16 pounds. They were built



OUR START NORTH, MARCH, 1895



THE FIRST SLEDGE JOURNEY, 1895

in Norway. A few I had made 13 feet 6 inches in length, but I found the greater length a source of weakness, and so discarded them after the first spring. The most useful one, however, was 11 feet 6 inches in length and built of ash, weighing 23 pounds. No nails or pegs were used in any portion of these sledges, the parts being lashed together with raw hide, to give greater spring and elasticity to them. They behaved magnificently, and two went through not only the whole of my Franz-Josef Land Expedition, extending over three years, but also through the journey I took in 1893 to 1894 to Waigatz and the Bolshaia Zemelskija Tundra.

When starting sledging they were loaded up with great care, a duty I always performed myself. I never put more than 340 pounds on any one sledge after the first spring, thus keeping them fairly light and less liable to break down, and also more readily handled amidst hummocky ice and deep soft snow.

My present intentions are to push north, by way of Markham and Austria Sounds, but on the first, our preliminary journey, to travel only far enough to establish our first depot of provisions, get an idea of what the ice is like in that direction, and the requirements of it, and then return to fit out again.

We expect to find a large mass of land running to the north, as shown in Payers's map of the country, along the coast-line of which we can travel and establish depots of provisions, and which may enable us to advance a long way to the northward.

March 10th, Sunday.—Left Cape Flora at 10.40 A.M. with two ponies drawing four sledges with total weights of about 1700 pounds, including provisions for depot, 152 pounds (fortnight's rations for five men); hay and oats for horses, 720 pounds (two months' rations for two horses). Also food and equipment for three men and two ponies for seven days.

I drove the black pony ("Blackie") ahead of the others with two sledges. Armitage and Blomkvist followed with a bay pony and two sledges, with the trahometer wheel on the rear sledge, which was an instrument I had had constructed in London for measuring distance travelled. This failed to work well, owing to defective workmanship.

The crew of the *Windward* turned out and gave us parting cheers as we left. The sledges and party were photographed on leaving.

A THOUSAND DAYS IN THE ARCTIC

We proceeded round the point of Cape Flora and up Miers Channel. Weather fine, clear, and sunny. When north of Cape Flora we met a stiff breeze from the north, which made the cold felt. The crust on the snow is hard, but much cut by the wind and with much evaporation below the surface, causing the crust to break. Ice level, but with low hummocks.

Camped at 6.15 P.M. at Camp Point (northwest point of Northbrook Island), to which I gave this name. We tied the ponies up to a hummock of ice with halters and hobbled them. Our two dogs "Räwing" and "Beauty" we fastened up to a peg driven into the snow near the ponies. We took these dogs to give us warning in the event of bears approaching the camp. On the ponies we fastened horse-bells. We slept in our "soviaks," "militzas," and "pimmies," with "tobocks" on our feet, and short skin breeches. I carried no sleeping-bags. The tent we used on this journey was made for us in England and originally weighted thirty pounds complete, but after various additions for strengthening, it became heavier. It opened and closed very much like a Chinese lantern, and although the principle of its design was excellent, it was easily and quickly pitched, and gave much space inside for its size; owing to the breakability of the ribs it gave us much trouble.

The spirit-stove designed by myself proved excellent. Two large pots, a kettle, and a frying-pan fitted one inside the other, and the whole is inclosed in a cylinder-like casing, with a door and a lid on the top; in this the lamp burns. Being made of aluminium it only weighs five and a half pounds. In the most severe gale of wind I have never known it so much as to flicker, and am entirely satisfied with it.

Of food, consisting of bear pemmican, biscuit, tea, cocoa, dried soup, cheese, and butter, I allowed three pounds per day each man.

On reaching the spot where I had decided to camp, the first care was for our animals. The ponies were taken out of the sledges, their blanket-coats strapped on, tied up to a hummock with halters, hobbled, and fed. The dogs were then fastened as outposts, to give us warning of the approach of bears, and given their pound of meat each. We then proceeded to pitch our tent, arrange our gear, get into our furs—our socks and mitts wet from condensed perspiration placed upon our chests to dry,

THE FIRST SLEDGE JOURNEY, 1895

as, of course, we have no fire—and cook our dinner. The culinary duties I always undertook myself. Then followed a pipe of tobacco; and we rolled over, glad that our day's labor was over, and fell asleep, which was sound enough unless awakened by too severe a temperature, the approach of bears, or animals breaking loose. All this is simple enough, in spite of the severe cold, if the weather be fine; and hard-frozen food and clothes as stiff from frost as galvanized iron are viewed with complacency, although, perhaps, hardly in accordance with the tastes of many. But let a gale of wind get up, with its invariable accompaniment of dense driving snow; then pitching one's camp is not amusing. In the most suffocating blizzard nothing can be seen but a dim white circle a few yards away. The sky and earth are blotted out from view, and nothing can be heard but the rush of the wind. The tent, which we have been struggling in vain to pitch for the last half-hour, bangs and flaps and threatens to tear itself from our grasp, and every few minutes we have to leave off work to rub our frozen cheeks and noses, and swing our arms to get some warmth into our hands and bodies.

By patience and strenuous efforts Armitage and I at last get the tent up, with the gear and food inside, but the former we find is not quite satisfactory, as a stream of fine powdery snow drifts into it, covering everything inside with its cold mantle. Supper is cooked under difficulties in the semi-darkness, and the dense steam arising from our operations in the cold air renders sight at more than two feet distant out of the question, and the crouched position the size of the tent (which is only five feet high) necessitates causes frequent cramps in the legs. However, all unpleasant as well as pleasant things come to an end some time, and such is partially the case with us; and having demolished our supper as best we can, we lie down in our furs, having changed our socks, moist with perspiration, and placed the wet ones on our bare chests to dry, and lie down to sleep, listening to the howling gale and the whines of the poor dogs outside, and wondering if the wind will break up the ice upon which we are encamped and drive us out to sea. The ponies have humped up their backs and turned their hind-quarters to the wind, and the dogs have tucked their noses under their tails and are nearly buried in the drift, but neither ponies nor dogs can sleep. The temperature is lower than thirty below zero, and that in a gale is

A THOUSAND DAYS IN THE ARCTIC

cool. Man, however, has a somewhat better time of it, and oblivion removes his cares of the day.

Snowing and blowing all night. Travelled fifteen geographical miles.

March 11th, Monday.—The morning broke, revealing dense mist and heavy snow. The atmosphere is so thick that no objects are visible at a greater distance than fifteen yards.

After feeding the ponies, a good wash—or at all events as good as the circumstances of a cup of warm water would allow—was the next thing on the list. I always strip to the waist, and with a small piece of sponge and soap and a tooth-brush which I carry, managed to freshen myself up considerably. Washing is a necessary; I never on one single morning missed it during the whole time we were in Franz-Josef Land, with the solitary exception of three days in succession when we were blown off the coast in the summer of 1896, in an open boat in a gale of wind, and then we were very fully occupied in trying to keep afloat, and nearly had more washing than we desired.

I have washed in temperatures as low as forty-six below zero, stripping bare to the waist to do so, and never derived anything but good from it. True, it is not exactly a pleasant process, and it is well to hurry up or one would be frozen, and a minute towel, hard with frost, is not soothing to the face. But in my opinion the sense of cleanliness and freshness derived, if only comparative, owing to the lack of water, entirely compensates for the pains and penalties involved in the process. One of my sledging companions considered that a wash once a week in his under-clothing to amply meet the question, with which I have little doubt the many will coincide. I may be "faddy" on the subject, but I prefer a wash every morning, and had it.

We then took our breakfast of bear pemmican, dried soup, and tea. On the weather clearing somewhat to enable us to see a short distance ahead, which we had sat in the tent and eagerly looked for, we packed up our belongings and stowed them on the sledges, harnessed the ponies, and again resumed our tramp.

It has been snowing all day with overcast, misty weather. Evidence of foxes was seen about six miles north of Northbrook Island.

Camped at 6.40 P.M.

Land in sight to north, appearing occasionally after 3 P.M.

THE FIRST SLEDGE JOURNEY, 1895

through the snow and mist. The elk-skin boots are very troublesome to get on in the morning, being frozen as hard as steel, and we have to put them inside our "militzas" for an hour before it is possible to force our feet into them. On taking them off the night before, we had placed them in such a manner as to retain the shape of the foot, otherwise after they had become frozen hard we could not have got our feet into them at all. The snow is deep, and the crust upon it insufficient to bear ponies or men, making it rather heavy travelling. The collars of our "militzas" and "soviaks" are becoming a mass of ice, cutting our necks, and making it difficult to get our heads through, and will require altering before the next journey. There are many flat-topped bergs and low hummocks in the ice travelled over to-day. We went twelve and a quarter miles direct. I should not like to say how many we really trudged backward and forward to accomplish this.

March 12th, Tuesday.—Started at 10.30 A.M. in a thick fog and heavy snow, and proceeded by compass bearing of hummocks N.N.E. till 1 P.M. over very hummocky ice, when we had to stop and camp, it being impossible to see many yards ahead. We were plodding through the snow under great difficulties, being quite unable often to distinguish elevations from depressions, and near hummocks were enormously exaggerated in height and often looked like mountains. It was difficult to clearly distinguish snow beneath one's feet, and often we would find ourselves with a pony and sledge on the top of a snowdrift with a drop of three feet on the other side, over which we would step with a sudden jerk, quite failing to see the dip until over it. It was like walking blindfolded. These difficulties were caused by the total absence of shadow and by the dense mist.

It cleared slightly at 5.30 P.M., and we could distinguish land to the northeast, but were unable to estimate the distance owing to the thick weather.

Travelled four miles direct. Hardly a record performance!

March 13th, Wednesday.—Started at 10.30 A.M. over very level ice covered with snow much cut by wind. Many fair-sized flat-topped bergs to be seen. We reached the land about 2 P.M. in a small bay with a snow-covered plateau cleared of snow in places by the wind, with glaciated land above it. In the centre of the bay is a basalt rock with a small glacier coming over the centre

A THOUSAND DAYS IN THE ARCTIC

of the face of it. To the west of this rock are a number of large boulders. We ascended the glacier above the plateau up to a thousand feet (by aneroid). The glacier still inclined upward as far as we could ascertain; we could only see a short distance owing to the mist. We met a strong wind on the glacier with a temperature of 22° below zero, and both Armitage and I got our faces a good deal nibbled by frost. We are a little uncertain of our position, as we have been travelling in a dense fog in an unknown country, and it is now impossible to take any observations to fix this spot. The plateau is covered with boulders and loose stones, and terminates westward in a spit. It is 146 feet high. We began making a depot among the low rocks on the west of the bay. Camped on the floe at 7 P.M. Travelled six and a half miles direct.

March 14th, Thursday.—Continued making the depot, and I took a few photos of it. I mended a 13 foot 6 in. sledge which had got broken at the last moment, owing to an upset. After having some food we packed our baggage, marked the depot with two jacks, and at 5 P.M. started off W.S.W., steering by the wind, as the fog made it impossible to see anything ahead and so take compass bearings of hummocks.

We stopped on reaching hummocks to which we could tie up the ponies, and camped for the night about 7 P.M. Travelled three and a quarter miles direct.

My journal I religiously write up daily before leaving camp, doing it in pencil, which I ink in at the end of my journey. This is rather a chilly process, as bare hands of course are necessary, and the icy-cold note-book in a temperature of thirty-five to forty-five below zero is a little cooling to the hands, which every minute or so have to be thrust into the trousers pockets to avoid frost-bite, and when the circulation has become somewhat restored the scribbling goes on again. Armitage has most perseveringly taken the readings of the thermometers and the barometer at stated intervals, which is anything but enjoyable work in bad weather. Our noses and cheeks are beginning to look very lovely; being covered with sores and scabs caused by repeated frost-bites, we look three of the most shocking ruffians imaginable, and much is the fun and many the jokes caused by our appearance.

March 15th, Friday.—At 10.30 A.M. the weather had cleared up

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a bit, so after taking compass bearings of the principal points visible and photos of the camp, we proceeded towards the north-west point of Northbrook Island (Camp Point). The thermometer remained at 37° below zero all day, falling to 45° below at night. Pretty cool it is too. We camped on the floe a little to the south of Camp Point at 9 p.m. Travelled sixteen and three-quarter miles direct, but covered considerably more. Thinking that a little port-wine fortified with brandy would be



A CAMP

a useful adjunct to our sledging stores, we took some with us in a rubber bottle. This evening the idea occurred to us to indulge in a nip, but to our extreme disgust we found that, owing to the intense cold having converted the greater portion into ice, we could not extract a drop. Armitage and I then took turns to sit upon this very cold egg to endeavor to thaw it out, but after nearly an hour of this hatching process we only succeeded in obtaining about a desert-spoonful. We shall not carry it upon our next journey.

March 16th, Saturday.—The low temperature still continues, and we started at 11 A.M. with a temperature at 38° F. below zero. Before leaving we took a round of bearings and proceeded down

A THOUSAND DAYS IN THE ARCTIC

Miers Channel towards Cape Flora. We arrived at the hut at 5.15 P.M. All the crew of the *Windward* appeared on deck as we passed and gave us a cheer. Refraction has been very great throughout the day. A mirage exactly resembling open water, with the shadows of the bordering ice upon it, appeared to the east of Mabel and Bell Islands. It exactly resembled water mirages I have seen in the tropics.

We arrived back with our faces very much marked with frost-bites, and the fingers of both my hands and two fingers on one of Blomkvist's are much blistered from the same cause.

I had a good wash every morning naked, stripping to the waist, and Armitage did the same, excepting that he kept his singlet on, in which perhaps he was wise. Blomkvist did not see the joke in it after trying one morning only. Perhaps Englishmen view washing in a different light to other people.

The statement made by some travellers is not quite correct, that when sledging washing is impossible. We had the thermometer down at forty-five below zero, which is quite cool enough for a test as to the possibility of cleansing one's self thoroughly at low temperatures. We were much bothered with ice forming in the collars of our "sovieks" and "militzas," and the elk-skin boots were a treat every morning. They are, however, excellent for use when living in the house, but become more like iron boots when sledging. I shall use reindeer-skin ones when we start again, as they are more pliable. All our food was frozen as hard as a rock — cheese, bacon, condensed milk, sardines, butter, etc., becoming like adamant, and had to be cracked up with a tomahawk to enable us to thaw them in a frying-pan, when they flew in chips like pieces of stone at every blow. Our furs and clothes got very stiff from the cold. We could hardly wear our woollen mitts, as they contracted to such an extent as to make it difficult to force our hands into them. None of us wore goggles, although we had some with us, but we did not suffer much from snow blindness. I allowed three pounds of food per day per man, and ten pounds per day per pony. It appears to be sufficient for the latter, and three pounds are quite enough for us. Armitage walks well, but it tires him at present. Blomkvist is a slow walker, but, I think, a stickler. Both are capital chaps.

March 16th, Saturday.—Arrived back at the hut at 5.15 P.M., having deposited our food and that of the ponies in a depot made

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among some rocks on Hooker Island. Our trip was a fairly successful one, considering that out of five days going out and one spent at the depot, we had four of thick fog and snow. The weather we experienced was pretty cool, being as low as 45° F., and much lower than the temperatures registered at Cape Flora in our absence, due no doubt to the warmth arising from the open water-lanes south of Cape Flora. We saw no indications whatever of open water north of us.

As we drew near the ship we were seen, and all the ship's company appeared on deck and gave us welcoming cheers. We heard that there had been much snow and thick weather during the week at Cape Flora, but not to the extent or as long as we had met with.

The ponies behaved splendidly, and their services will be invaluable. We travelled seventy-three miles. The doctor reports to me that Mouat is down with scurvy. He and "John" are the only two of the crew who have exhibited such distaste for bear's or walrus's meat as to refuse to take any. They can't "abear it," they say. They have both drunk an ounce of lime-juice religiously every day. I had been expecting one or both of these men to fall with scurvy, as they prefer salted meat to anything. This case is very instructive as to the cause and prevention of scurvy. I have long looked upon lime-juice as ineffectual; I think so now more than ever. I, however, insist upon the crew having it daily, and send the doctor down to see it taken by all hands, as they come under the Board of Trade regulations. I have given orders that no more salt meat is to be eaten, and have had it locked up, which causes some grumbling. I should like to throw it overboard, as I think it may be the cause of Mouat's scurvy, but consider it better not to do so.

The little bear has fairly taken charge of the hut, and bites and scratches every one within reach. It has now a collar and chain on, and is secured to the wall of the room.

March 17th, Sunday.—We were occupied most of the day in getting the frost out of the gear we brought back, and thawing out and removing the ice and moisture from our "soveiks," "militzas," "pimmies," "mitts," etc.

Poor "Beauty," who had gone with us on our late journey to give us warning of a bear approaching the ponies, was set upon this afternoon by all the other dogs, which I had let loose for a few minutes for a run, and although he was brought into the

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hut and treated by the doctor, died within an hour. I gave the murderous curs a thrashing all round, which I hope may act as a deterrent in the future, and have told the doctor and Maxim to secure them with collars and long chains to the spars of timber behind the hut to-morrow. I thus hope to keep them in good health in the fresh air and sunshine, when there is any, and to prevent them killing each other. I have had all of the dogs let out of the kennel daily after the return of the sun, as they were going off in condition.

March 18th, Monday.—Thawing and drying the ice out of our "militzas," "soveiks," and equipment, and making preparations for our next push north.

About 1 P.M. the carpenter came up to say that he believed the dogs were after a bear beyond "Bear Corner." Armitage and I started off with our rifles, and found Smith, the second engineer, on the top of the bergs at that spot. He had seen the four dogs after a bear going fast to the south, but had lost sight of them in the distance, neither could he now hear the barking. Armitage and I, however, started off in the direction they had gone, and after running down their tracks for twenty minutes or so, we could hear the barking of the dogs, and followed it up over very rough, tumbled about ice, and eventually came within sight of Mr. Bear close to an open lane of water, through which the tide and current were running at about three miles an hour, and carrying detached blocks and crushed-up ice. The bear on our approaching entered the water and clambered on to a floating lump of ice, where Armitage put a bullet into his right shoulder. I then crept over a lane of loosely frozen and rather unsafe brash-ice and got within fifty yards of him, and shot him through the neck. He fell backward into the water, unfortunately, and within a minute was quite covered over by the rapidly moving ice, so that we had no chance of getting so much as a pad, much to my regret, as we want meat. We had chased him for about three miles from the ship.

March 19th, Tuesday.—The doctor handed in his report re Mouat's case, of which the following is a copy :

"ELMWOOD, CAPE FLORA, FRANZ-JOSEF LAND, *March 15, 1895.*

"*F. G. Jackson, Esq. :*

"SIR,—I have to report that a case of scurvy has broken out on board the *S. Y. Windward* in the person of William Mouat, a seaman, who gives

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his age as fifty-two years. This up to the present is the only case that has come under my notice.

"The man in question is one of the two men who have persistently refused to partake of the fresh meat, in the shape of bear's and walrus's, which is obtainable in this locality; the other man being John Webster, the boatswain, all the others having eaten it regularly. The last-named, although not attacked with scurvy, is anæmic, and not in first-class condition. All the others, which number thirty-one in all, who have passed the winter of 1894 to 1895 at Cape Flora are in good health.

"This case has occurred notwithstanding the fact that an ounce of lime-juice has been regularly served out under my personal superintendence every day to each man since September 23d last.

"His symptoms are a blue hæmorrhagic patch with stiffness and pain about the left ankle, with œdema of both ankles. Loss of appetite, coated tongue, which is also large and flabby, with dental notches along the edges. Tenderness of the teeth and gums, which last are bluish, swelled, and spongy-looking. He is also markedly anæmic. He has been taking iron for the last week or more. I have ordered him to take bear's-meat every day and also soup to which bear's blood is added. This I have every reason to hope will prove efficacious and restore him to health.

"I have the honor to be

"Your obedient servant,

(Signed)

"REGINALD KOETTLITZ, M.R.C.S., etc."

We are pushing on our sledging preparations with all speed. I have Petersen up at the hut all day altering furs and doing odd jobs.

We started digging out the aluminium, copper, and Norwegian boats to-day. They are buried in deep drifts and frozen solidly down. I am having canvas chest-protectors made to go on the ponies, as the new harness has much chafed the bay pony's shoulder.

The tents are having the paint removed and several alterations effected.

I climbed the talus about six hundred feet to-day, by means of ice-spikes and an ice-axe, taking my breech-loader to try and kill a few looms and rotches, which could be seen flying among the cliffs at the top. I killed four, but they all fell out of reach. The rotches have all cast their winter-coats. I am anxious to get some birds for our scurvy patient.

March 20th, Wednesday.—Armitage and I started off with the bay mare pony and the English sledge to go over the ice to Bell

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Island, to try and find Leigh Smith's records there to send back home by the *Windward*. The pony at starting went very sluggishly, and I had fears of trouble to come before we got back, but having gone some way I did not wish to return, and hoped it would improve. We had a good deal of rough ice to pass over, and one perfect stone-quarry-like line of hummocks, of piled-up ice 20 ft. high by 150 ft. across, which gave us much trouble to get the pony and sledge over. On approaching Mabel Island I saw a she-bear taking a couple of small cubs out for an airing on the floe, which were trotting along behind their mother. On seeing us they beat a retreat to the ice-covered slope of Mabel Island, followed by "Sammie," the bear dog, and on coming up with them I found the she-bear making vigorous rushes at him. On my approaching within about fifty yards of her, she made a determined charge at me, but was stopped by a shot in the right side of the neck from my .303 rifle when she was thirty yards off, which made her spin round like a top, but, recovering herself, she returned to her cubs. On approaching her again she rushed at me a second time, and I gave her two more shots before she was killed. I caught the two cubs (which were about two months old and a shade larger than our infant at the hut), which bit and scratched vigorously, and strapped them by the neck to the sledge, which Armitage had now come up with. We then went on our way towards Bell Island to look for the weather-board hut that Mr. Leigh Smith had put up thirteen years ago. We went all round the island, but could find no signs of it. It has evidently been blown away. We had already walked nearly all the way, as the pony went so badly. I left Armitage to take the pony and sledge a short cut across the island, while I followed the coast all round to avoid any chance of missing the hut if it were still standing, as I thought. The island is about four miles round, and a mile and a half long. The east end rises to high basaltic cliffs, 930 ft. high, falling to a raised beach about 75 ft. high.

I found a very old vertebra of a whale, rotten from age, on a raised beach about 80 ft. above the present sea-level. Mabel Island appears to be entirely covered with glacier, except for a short distance between two high basaltic cliffs, where a long spit runs out to the sea; whereas most, if not the whole, of Bell Island is clear of ice, and of nearly all the snow in the end of summer. Bell Island has only a small ice-cap above the cliffs,

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whereas Mabel Island has a dome-shaped cap of considerable altitude above the cliffs on the southwest side.

As we were passing along the floe at the foot of the high cliffs, "Sammie" spotted two bears together, about two-thirds of the way up the ice-covered slope of the talus, 600 ft. high, and began barking loudly. I climbed up as high as I could get, which was to within eighty yards of them, and at my first shot put a bullet through the head of the higher one, a female, which was looking at me over the back of her husband, and she came bowling over and over, head over heels, down the high, very steep slope on to the floe below—a very pretty sight. The second bear (a huge male over eight feet long) at first dashed down as if making for me, but a shot from my .303 evidently convinced him that I was not at all a nice person to become acquainted with; and he floundered and rolled down the slope in the direction of Armitage and the pony and sledge. I gave him another bullet as he passed me. Armitage was unarmed, which gave me considerable anxiety on his behalf, and I slid down to his help. However, two more shots practically knocked all the damage out of him by the time he got to the bottom, but even then, and in spite of a broken right shoulder, he got on to his legs and looked savagely around for some one to go for! A fourth shot through the heart finally shut him up. He was an enormous elderly he-bear, the largest I have ever seen, and considerably over eight feet long. We had now a bag of five bears, which was pretty good for one afternoon. It was now 8 P.M. and getting dark, and we were twelve miles distant from the hut, with a done-up pony. Still, the he-bear being of such unusual size I was very anxious to take his skin, so Armitage and I set to work at him in a temperature of 30° below zero, and soon after 9 P.M. got his skin off and had taken the head and fore-paws of the she-bear and lashed them on to the sledge. After a lot of whipping, we got the pony under way at a crawl. Thus we slowly proceeded, Armitage walking on one side with the whip, I on the other with the reins. After going about two miles the pony lay down and refused to get up, explaining that she was dead beat and could go no farther. It looked like an all-night's job staying by her for us. I at last got the harness off, and managed to get her up. We tied the little bears on the top of the sledge and covered them up with a reindeer-skin, and left them as warm

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and snug as we could make them, to be fetched next day, and proceeded to trudge to Cape Flora, carrying my "militza" and rifle and leading, or rather dragging, the pony, as it would hardly walk. Armstrong brought up the rear, carrying his "militza" and the small camera, and endeavored to bustle the pony into a walk. I took bearings of the rocks on Bell and Mabel Islands to mark the position of the sledge. So we proceeded over the most abominable ice possible to get a pony over, especially in the dark and in a thick mist that hid Cape Flora from sight, marking our course by a star that was visible. We at last reached the hut at a quarter to three in the morning, rather tired and very hungry. We had walked about twenty-eight miles in all. I mean to fetch the sledge to-morrow with a pair of ponies.

I much prefer Cape Flora for a wintering place to Bell Island.

I blistered my fingers with my gun badly when shooting the she-bear with the cubs. I used my bare hands in a temperature of 30° F. below zero, doing so because she was charging around so briskly, and was altogether a rather unpleasant old party. I was afraid that mitts might delay me in getting in a cartridge at a critical moment.

Weather: Calm throughout. Fine and clear in the early part of the day. Very misty in the evening and at night.

March 21st, Thursday.—Blowing a fresh gale, with driving snow, and a temperature of 20° to 27° below zero. I set to work and manufactured some double reins, and had one of the reindeer sledges rigged up for harnessing up a pair of ponies. At 1 P.M. I went to the ship and saw the captain about some more flour and sugar for the ship's company, as he tells me they are again without any. I sent down a 196-lb. cask of flour and 56 lbs. of sugar. At about 2 P.M. the gale looked like dropping, and we harnessed up the black and bay ponies, but before this was done it was blowing, and snow was driving harder than ever. I, however, decided to try it, and we started off in great form at a hand gallop as the ponies felt uneasy at the loose sledge behind them; but before we had gone half a mile I had my right cheek badly frozen, and we could not see sixty yards ahead for the driving snow. As it was quite useless to go on, for we should never find the sledge in such weather, I decided to wait until to-

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morrow, much to Armitage's relief, who was ready enough to go if I made up my mind to, but did not at all relish it.

I have had all hands, including the crew, getting things ready for our second push north, but there is a lot to do.

I fear the little bears are having a bad time of it out on the sledge we left behind, but it can't be helped.

I went to the ship and saw Mouat, and sent him some portwine and vegetables. He is very depressed, poor fellow, and



OUR INFANT BEARS "MABEL" AND "BENJY"

doesn't seem to mend much. He is an old man, and should not have come on such a voyage as this.

March 22d, Friday.—I hear that "Old John," the other man who has not eaten bear's-meat all the winter, has now got a thorough scare owing to Mouat having scurvy, and now is in deadly fear of taking it himself. All his bravado about not needing fresh meat is gone, and he not only eats his portion at the regular meals, but gets up in the middle of the night to cook and eat bear steaks in his cabin, and several of these "delicacies" have been found in his bunk. He has a little rheumatism in one ankle, which he is in terror of proving to be scurvy. He shows it to the doctor every day, and goes into the fore-castle to show

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the hands there, and to ask if it is "like Mouat's." It is *very* amusing! He will be all right now.

Armitage and I started off at 11 A.M. to fetch the sledge left near Bell Island on Wednesday night. I drove the two ponies harnessed to a reindeer sledge. We went out at a spanking pace over some very rough, hummocky ice, in a manner that would, if poor Franklin or Parry could wake up, make them open their eyes. The ponies behaved splendidly, and we got them over places that would have astonished some people at home. We found the sledge all right, with everything intact, and the two little bears alive and kicking, and as full of bite and scratch as ever: starvation for two days had not quieted them in the least. We lashed this sledge behind the one we had driven out, and so started back, but in crossing the "stone quarry" my companion unfortunately fell across it and broke it, and I had to place its load on the reindeer sledge. We got back at 3 P.M. (twenty-four miles in four hours, and over much rough ice). I had my "turn out" photographed on our getting back.

We are trying to feed the two new-comers on meat extract—we can't afford to feed three bears on condensed milk. We have now three bears, six pups, and a bitch living in the same room (12 by 13 ft.) with the eight of us. A fairly good menagerie!

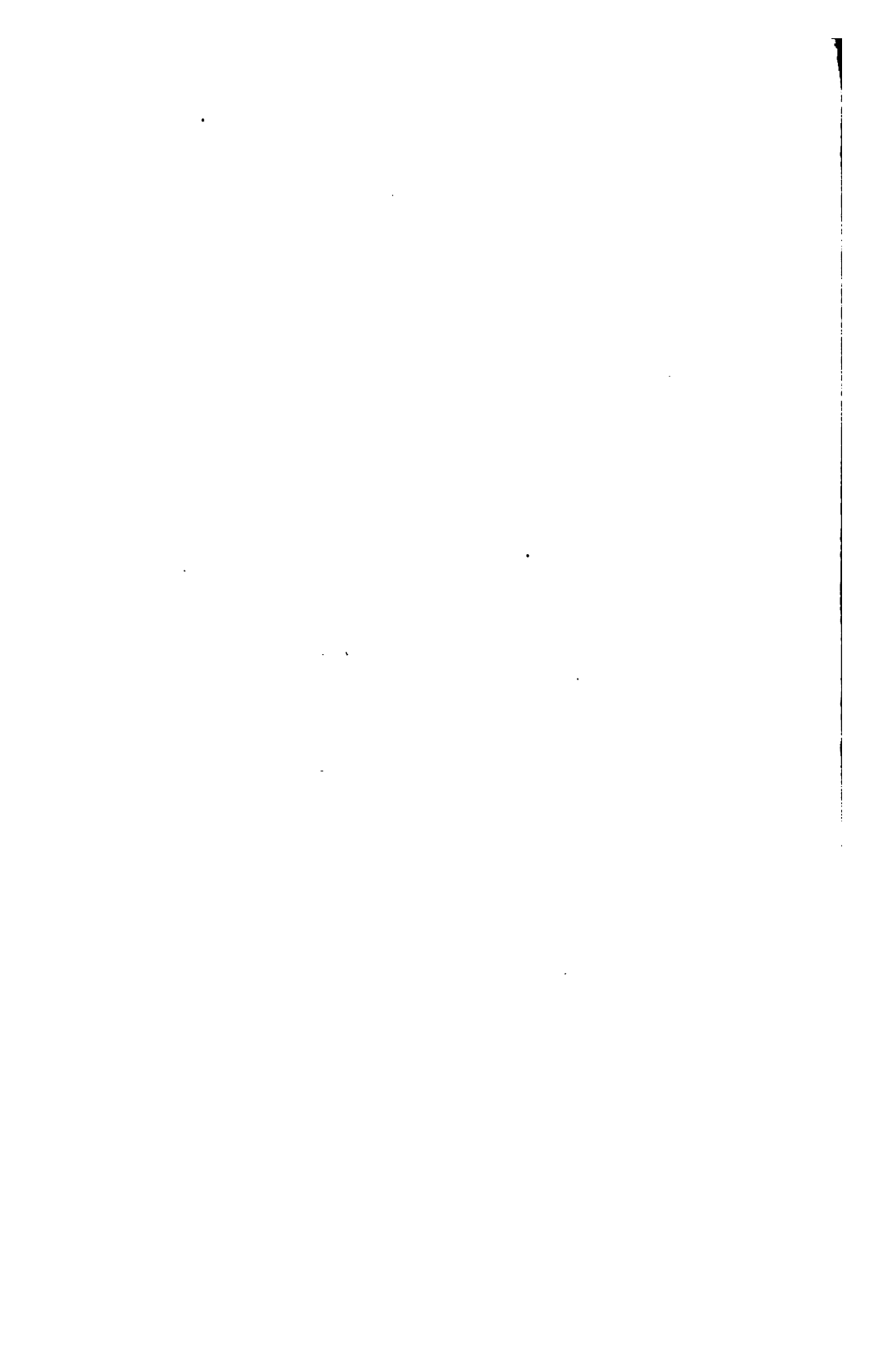
I have christened the cubs, to distinguish them, "Gertie" (Cape Gertrude), "Mabel" (Mabel Island), and "Benjy."

March 23d, Saturday.—I weighed the three bear cubs, and found that the Mabel Island she-cub weighs 18 lbs., the he-cub 17 lbs., and our Cape Gertrude one 17 lbs. The new-comers are much quieter and better behaved than the Cape Gertrude cub, and have met with a very unfriendly reception from the latter, who has "gone for" them whenever she has been brought near them. I am afraid that it is a case of familiarity breeding contempt with her, for she has become most shockingly bad-tempered.

March 24th, Sunday.—Blomkvist and I did some ski-ing on the floe, and ran several of the snow-covered slopes on to the ice. I had all the expedition party out, and instructed them in the erection of a tent, and dictated a number of instructions to the doctor to be followed when camping out. I intend to send the doctor, Heyward, Fisher, and Child with two ponies with stores as far as Camp Point, to give them a little experience in travelling and to



THE RETURN FROM OUR BEAR-HUNT, MARCH 23, 1895



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carry on provisions. It is only fifteen miles from here, so they can come to no harm, and should only be out one night.

March 25th, Monday.—The Mabel Island bears are rapidly becoming as noisy and rowdy as the one from Cape Gertrude, more especially the she-bear Mabel, which is particularly bad-tempered. The little he-bear has always been better behaved than the other two of the feminine gender, which no doubt is a remarkable anomaly.

Spent the morning writing and making out weights and quantities for our trip north. Got out the aluminium boat from the drift, and mounted the middle section on a sledge, and brought the end section into the house and thawed it out before the canvas gunwales could be raised. Painted canvas is of no use for these latitudes. The aluminium wire netting and coiled wire is very liable to rot from exposure to the sea-air, and is of little service.

I sent the doctor, Heyward, Fisher, and Child out with Blomkvist and two ponies with sledges to get used to them, and to practice tying them up to hummocks and hobbling them in camping for the night.

Armitage and I went out on our "skis" for a short turn, and ran the steep ice slope on to the floe, coming down at a terrific pace before a stiff north wind. Armitage very pluckily stuck to it, but came a most fearful cropper every time before reaching the bottom.

March 27th, Wednesday.—Blowing hard in gusts all day. Writing and superintending various jobs. Fisher and the doctor engaged in weighing out provisions.

To-day, when reading an aneroid barometer, I noticed the pointer fall a tenth during the gusts of wind, and after they had passed immediately rise again. Am having the new pony harness again altered, as it chafes the ponies' shoulders still, in spite of the chest protectors. Am now fixing them to the Russian collars after the wood-work has been removed. There is an awful lot to do, as I attend to every little detail myself, even to seeing that each man's furs fit him properly.

March 28th, Thursday.—Hearing a great rumpus among the dogs made fast to spars behind the house, a little before 8 A.M., I sent Heyward to look over the snow rampart to learn the cause. He rushed back, reporting a bear to be creeping up to the dogs. I

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put a coat and skin boots on over my pajamas and, followed by Armitage, hurried out to find the bear close to the hut and looking over into the narrow enclosure. I gave him a Tweedie bullet in the neck, which practically finished him, but as he struggled away six or eight yards he got two more from Armitage and me. He was a very bold young he-bear. He had only a little grass in his stomach, and his lungs were studded with round, hard, white nodules of the size of canary-seed, which suggest tuberculosis. I have asked the doctor to preserve some for examination in England.

Note.—Professor Vaughan Harley informs me that he has also found miliary tubercles in some bear's liver he has kindly examined for me.

We are hurrying on our preparations for a start. I sent the two Mabel Island bears, "Mabel" and "Benjy," to the *Windward*, as John has offered to take charge of them. They turn our place into a perfect bedlam of noise.

March 29th, Friday.—Preparing generally for our trip north. Weighed the aluminium boats—boat of aluminium (entirely), middle section, 150 lbs.; boat of aluminium (canvas gunwales), middle section, 120 lbs.; two end sections, 50 lbs. each.

I had fresh sennit halters and reins made at the ship, and got the captain to work making bags for provisions and to construct three small canvas basins. I have sent the she-cub "Gertie" to be placed under John's care at the ship. We can now hear ourselves speak. She and the other she-cub "Mabel" have become perfect little furies. The he-cub "Benjy" is much quieter and better behaved.

March 30th, Saturday.—Continued our preparations. Brought, after much struggling, the middle section of the aluminium boat into the hut to thaw out the painted canvas gunwales to enable us to raise them. Sent the four ponies down to Sharpe's rock where the wind has blown away the snow, exposing some green grass which was suddenly frozen at the end of last summer. They will eat this grass and thus save hay which will run short. I am saving all straw-packing and chaff for them. They are not fastidious, thank goodness! I had them hobbled out and sent Doran to protect them with a rifle from bears. He wandered up and down, stamping his feet and slapping his arms to keep warm. As one of the bay ponies has the character of being a



DRAGGING OUR WHALE-BOAT FROM THE DRIFT

THE FIRST SLEDGE JOURNEY, 1895

perfect terror for kicking and rearing, and broke away from Fisher on his way out to the feeding-ground, I went out myself at 1.30 P.M. and unhobbled him and brought him back.

March 31st, Sunday.—Writing all day until 5 P.M., as it was snowing all the time. We then all went out ski-ing down the steep slope from the plateau on to the floe a little west of the ship. The snow stopped for an hour and then came on thicker than ever, forming a layer on the flat, without drifting, of about five or six inches by the evening. This is the first time since last September that we have had fairly good snow for ski-ing.

As Mouat is not improving fast, I intend to have him up at the hut for a week or so ; the change will do him good.

Weather : At 8 A.M. overcast, misty weather, with thick falling snow and light airs from E. to W. At noon light N.E. airs and overcast misty weather, and thick snow. At 4 P.M. light E.S.E. wind and similar weather. At 8 P.M. fresh E. by S. wind and overcast, snowing less thickly, but the falling snow now driving hard and densely. Weather cleared slightly at 5 P.M. and stopped snowing for one and three-quarter hours, but at 6.45 P.M. became overcast entirely again and resumed snowing heavily.

April 1st, Monday.—Blowing a gale with densely driving snow. Deep drifts have formed round the hut. This weather is delaying our preparations dreadfully, as we can do nothing outside. The wind carries all loose articles away, and the snow fills everything.

Spent the day writing and doing what jobs can be done indoors—darned my mittens with string, etc. I have no darning-cotton.

Mouat is unable to be moved from the ship so long as this kind of weather continues.

April 3d, Wednesday.—Blowing furiously, and the snow driving fiercely. The wind has now swept clear of snow articles that had not been seen since last October. It is certainly the worst gale, being the most continuous in strength, of any we have experienced here. The weather is greatly delaying our preparations.

I spent the day in writing, but about 5 P.M. suggested a walk on the floe as being preferable to being mewed up in the hut any longer, which, as events quickly showed, it was as well we did not take. Soon afterwards, to my intense surprise, Smith came running up from the *Windward* to tell me "the ship is adrift."

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I put on my cap and ran out of the hut, followed by the others. On reaching the point I found open water all round her on the seaward side, the floe broken up, and the ice rapidly moving off, carrying away on it a whale-boat, a "Jack," a Russian sledge, and various smaller articles. But the ice nearer in shore and the ship herself were held by the berg against which she is lying. The question was how long this grounded berg would hold. The *Windward* would, of course, if adrift be helpless. All the sails and ropes are frozen hard and there are no fires in the furnaces, and various parts of the engines were removed for safety last October. All hands were at once set to work to get the other boat which lay on the ice on the land side of her on board—a difficult job, as she was buried in a drift and also packed quite full of hard icy snow. This, however, after a lot of trouble, was at last accomplished. I went and examined all the lines to the ice and saw that they were secure, and had another carried out from the starboard bow. Frost-bitten faces were the order of the hour during all this time, as the gale still continued with a temperature many degrees below zero and the snow drove furiously. One of the men had to retire with both his cheeks completely white all over from frost-bite. Having made the ship as safe as circumstances would allow and secured the lines, we went back to the hut.

At 10 P.M. I went down to the ship to see how things were. She was still safe in her position, but the old two-year-old floe to the east has completely broken up, and the sea is now roaring right under the plateau by Leigh Smith's hut, but the floe-berg at the point still shields the ship. Things look anything but pleasant. I had Allan, the chief engineer, down aft and told him to set to work early to-morrow with Smith and the firemen to get all the engine-fittings back into position, and everything ready to get water into the boilers and steam up in case of necessity. I also told the captain to set all hands to work early to get ice into the tanks for ballast, as the ship is at present very light. An officer and one of the crew are to be constantly on watch night and day. I much fear the ice north may also be broken up and may give us trouble when sledging.

Weather: At 8 A.M. fresh to strong E.N.E. wind, increasing in force and blowing a strong gale at noon, which gradually increased to a whole gale by 8 P.M. with furious gusts at frequent intervals. Cloudy, misty weather and thick driving snow.



DIGGING THE WHALE-BOATS OUT OF THE DRIFTS

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April 4th, Thursday.—The ship is still safe, but I feel very anxious about her. "Bear Corner" has disappeared, and there is a large tract of open water south, east, and west, and the gale from the E.N.E. is still whistling, but chopping about. It ceased towards noon. The wind allowing, all hands went on at the outdoor preparations for our journey and clearing away the deep snow-drifts round the hut.

About 8 P.M. I received a message from the captain asking if Mouat might come up to the hut at once, "as the ice is coming down on the ship." Not wishing a fuss to be made or an alarm caused, and as I had arranged for Mouat to come up to-morrow, I replied, "No," as I had made preparations for his coming up then. On reaching the ship I found a large floe and some smaller ice behind, and on the land side of it, rapidly drifting west with the tide and current, with a good deal of pressure, which, however, fortunately did not touch the ship, as she is out of the main strength of the current. The floe slowly and irresistibly advanced towards us, and there was cause for anxiety for some time, but it drove clear of the ship, and the point of it struck with a crash against the land-floe beyond, piling up mounds of broken ice, and then gradually slewing round and crushing up the bay ice, enclosed the ship, leaving her snug and safe in the midst of it. The smaller ice coming in behind quite shut her in. She had a near shave, however, and had the large floe hit her, would have crushed her like a walnut.

The crew were much alarmed for some time. For example, one came to me and asked permission to take his chest ashore, another wanted to have coals taken out and landed, and I understand that all the members of the crew had already put their things in readiness to remove them from the ship. If I had allowed our scurvy-patient to be landed it would have been a signal for a general clear-out. I would not allow a single thing to be removed from the ship. Time enough for that when there is real cause for it!

In the afternoon Armitage and I took out a sixteen-foot Norwegian boat and I shot four dovebies for Mouat. The current then was running west very strongly, carrying bay ice with it, and a stiff breeze from the east, too, made it very difficult to pull against.

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Weather: At 8 A.M. unsteady wind from N.N.E., varying in force from 2 to 7. At noon fresh to strong E. gale. At 4 P.M. fresh E.N.E. wind. At 8 P.M. calm. At 1.30 P.M. the gale suddenly dropped and became almost calm, increasing again to a fresh wind at 2.30 P.M., and decreasing to calm at 6 P.M. Snow driving hard during the gale. Misty in early morning, fine and clear the rest of the day.

April 5th, Friday.—The ship now lies snugly surrounded by bay ice to about seventy yards off her, around which the current runs carrying drift ice.

Mounting sledges, and I have now two loaded; got the middle section of the aluminium boat into the hut to paint, as it is much rubbed. I find aluminium is fearfully corrodable unless well protected. In the afternoon, leaving the others to push on with the work, Armitage and I went out and shot forty looms, roachies, and dovebies, in some open lanes of water near the ship, for our scurvy-patient, taking the twelve-foot Norwegian boat and paddles. I sent the whole ship's company a supply of birds and an extra number for Mouat. He, by-the-by, declines to change his quarters. He fears, he says, that he will "give too much trouble if he comes to the hut." He must please himself in this matter, as he is so ill, and the doctor advises me to let him have his own way about it, but I am sorry.

All the large space which yesterday was open water is now filled by a mixture of bay and very high crushed-up ice, and a few lanes which close up and open as the current moves the floes onward.

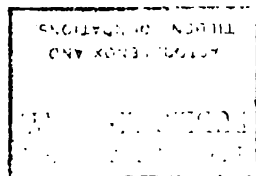
The crew are still busy getting ice on board as ballast.

April 6th, Saturday.—Packing the sledges and mounted the middle section of the boat.

The crew have been busy digging out the two whale-boats I had reserved for our own use. I have given them one of our two to replace the one carried off by the ice, so that they may be well supplied in case anything happens to the *Windward* on the way home. The doctor shot a few dovebies in the evening, and I got them out of the water for him in the twelve-foot boat. We did some ski-running over the rocks by the flagstaff for exercise, where Dalstrom had been practising. We had some rather nasty falls, owing to the very fast character of the snow, or rather ice, the steep incline, and the hummocky character of the ice on the



THE OFFICERS AND CREW OF THE *WINDWARD* 1894 TO 1895



THE FIRST SLEDGE JOURNEY, 1895

floe below. He and Blomkvist are first-class ski-runners, and have been used to it since they were children. I have lent the crew several pairs of ski to amuse themselves with.

April 8th, Monday.—I sent the following order to the captain :

“ELMWOOD, FRANZ-JOSEF LAND, *April 8, 1895.*

“Let it be distinctly understood that no one under any pretence whatever is in any way to interfere with Mr. Leigh Smith's house (Eira Cottage) or any article there. It is private property and will be respected as such. Any one disobeying these orders will be liable to the penalties for so doing, and also to those for infringing the laws of property. I shall expect you to see that these orders are enforced.

“FREDERICK G. JACKSON.”

April 11th, Thursday.—Writing hard all day until after midnight. The other members of the party are hurrying on our preparations. I went out with my shot-gun, taking Blomkvist with the twelve-foot boat, to get birds, as Mouat has finished his, and we have run out also at the hut. I shot sixty-six looms, rotches, and dovebies. I sent the ship's company a loom apiece and twelve for Mouat.

April 15th, Monday.—I wrote out the following orders for the skipper :

“ELMWOOD, FRANZ-JOSEF LAND, *April 15, 1895.*

“You are at once to get the ship generally into a condition for immediate departure, the boats with sails and masts into a sea-going condition, and two months' provisions always secured on deck, with casks ready to fill with water, and if possible to see that all sails and running-gear are in good order and ready for use.

“You are to leave here for London as soon as the ice is in a condition to allow you to do so, which will probably be towards the middle of June.

“You will speak no vessel on the way, except in case of urgent necessity in the case of yourselves or her; or answer any signals (except in the case of an English war-vessel) otherwise than by hoisting your ensign.

“You are to touch at no port on the way or go near any coast, unless compelled, until running in for the Thames, when you will pick up a pilot as soon as you arrive off the English coast.

“You will signal the ship's number on the first opportunity on sighting an English Signal Station.

“If Mr. Montefiore and Mr. Harmsworth should not be at Gravesend on your arrival there, you must send a telegram to Mr. Harmsworth immediately, and proceed to Greenhithe and await there his arrival, keeping a pilot on board until the ship is docked.

A THOUSAND DAYS IN THE ARCTIC

"I have instructed Mr. Heywood to give you what provisions are necessary for the voyage.

"The chronometer must be on board by June 1, or before if it should be necessary. Both error and rate together with our latitude and longitude have been given to you.

"In the event of abandoning the ship every effort must be made to save the mail.

"FREDERICK G. JACKSON,

"Commanding the Jackson-Harmsworth Polar Expedition."

Our mail is nearly ready.

I sealed all the letters up in a canvas bag which I had soldered up in a biscuit-box and placed in a cabin on board the ship, the key of which I enclosed in a note to Harmsworth, which I have given into the skipper's care to deliver to him.

I went down to the ship and saw him; I handed him his sailing orders and gave him final directions in case the ship should have got away before we return, which by the present look of the ice seems very likely. We then dragged all the loaded sledges down on to the floe, ready for the start north to-morrow, and gave the final touches to our equipment.

Perpetual daylight begins to-morrow.

CHAPTER X

SECOND SLEDGE JOURNEY, 1895

April 16th, Tuesday.—Armitage, Blomkvist, and I left Cape Flora about 11 A.M., with three ponies drawing six sledges, with one aluminium boat, with rations, etc., for two horses and three men for sixty-three days. I find I cannot conveniently carry food for three horses for the entire limit of time. We shall, however, probably lose a pony, or in any event can take pony food from the depot already established north. The doctor accompanied us with Heyward, with one pony and two sledges loaded with a fortnight's rations for them and the pony, three bundles of hay for us, and a sixteen-foot Norwegian boat to be left at the entrance to Markham Sound for our return journey if the ice breaks up behind us. We have 1823 lbs. on our six sledges, and the doctor has 650 lbs. on his two sledges. (This includes the weights of the sledges.) Both Blomkvist and the doctor had some trouble in getting their animals along, and the Norwegian boat rides badly. I drove all the ponies in turn to try and hasten them on, going backward and forward between the various teams. I gave the crew of the *Windward* a farewell drink on the ice before we left, and complimented them on their good behavior through the winter. We camped, about 7 P.M., five miles to the northeast of Camp Point in Nightingale Sound. We travelled twenty miles to-day direct. I expect the ship to be away when we return, to judge by the appearance of the ice off the land, but one can never say.

April 17th, Wednesday.—I was turned out by the dogs barking at 6 A.M., and a minute afterwards the doctor came to our tent to tell me that a bear was coming fast up to the camp. I turned out and got my .303 rifle and told the doctor to get his, and gave him the first shot. Mr. Bear came up on our tracks, and on coming near took a half-circle and came up from leeward towards us.

A THOUSAND DAYS IN THE ARCTIC

When thirty-five yards off the doctor fired at him but missed, and half a second later I put a bullet into his forehead, which passed through the length of the head, along the vertebræ, and out again on the right side of the base of the neck near the shoulder. I used a nickel-covered government bullet.

I took his head and paws, but had to leave the skin, which was a very fine one, owing to the weight. We always seemed to shoot the finest bears when away and cannot carry the skins back to the hut. He was a large he-bear, and had evidently followed us up through Miers Channel. We turned in again for an hour after this, and then struck camp and proceeded towards the depot made on March 14th. We can now see that Northbrook Island is somewhat smaller than on Leigh Smith's chart, and Miers Channel is much wider.

The snow is in ridges much cut by the wind, with rows of high hummocks. We reached the depot at 10 P.M. We found a bear had pulled the flags down and thrown the hay about. He had also torn a large tin cylinder open with his claws, and had eaten the bear's-meat pemmican inside.

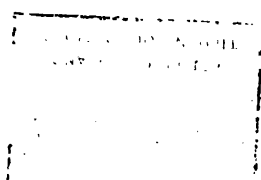
We travelled about sixteen miles, but wandered about a good deal to avoid hummocks.

April 18th, Thursday.—We deposited the sixteen-foot Norwegian boat near the depot between the two flags, and straightened up the articles pulled about by the bear, and then loaded up again. After finding a suitable place we started up the ice-covered slope of the land in a northeast direction. After proceeding some distance I found that we could not get on farther with only one pony to two sledges. I then hitched up two ponies to each pair of sledges, and took the first two ponies on for about three and a half miles, and then returned for the others. It was very hard work for them, and it was only by constant and energetic exertions on our part that we could get them up the very steep glacier slope.

We have come across a few cracks, but no real crevasses as yet. The horizon all round is very misty, and the refraction very great, making it impossible to distinguish land with any certainty, or to fix our position. The bold rock to the north may be Peterhead, but, if so, it is much farther east than marked in Leigh Smith's map, and he is very accurate. To-day everything is very deceptive, a flat berg at one moment looking exactly like



OUR START NORTH, APRIL, 1895



SECOND SLEDGE JOURNEY, 1895

land and the next altering its shape entirely. The surface of the glacier has become very bad going, being now covered with soft snow with a slight crust upon it, which breaks and lets one in with a jerk up to one's knees at every step. It is very tiring for both horses and men.

We stopped at 9 P.M., as the ponies were played out and refused to budge any farther; and we also felt very tired too. Our camp is 1500 ft. above the sea by aneroid.



OUR CAMP ON THE GLACIER

We went eleven and a half miles, having to go over the same ground three times, but only made good three and three-quarter geographical miles direct.

We made the ponies fast to the reindeer sledges, as there are no hummocks, which they immediately proceeded to eat, and gnawed nearly through the horizontal bars. They are terrible crib-biters.

April 19th, Friday.—I started at 9 A.M. with two pairs of ponies hitched to two sledges each—Blomkvist and I with the leading sledges, followed by the doctor and Heyward with the other two. I left Armitage at the camp to take angles in case the mist lifted, and to work out a dead reckoning. I also left four loaded sledges to be taken on when I returned with the ponies. The snow is very deep, with a slight crust, and we crossed some very ugly-looking cracks partly blocked with snow. We proceeded true north for some hours, and crossed a dividing ridge from which

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the glacier slopes to the west. I there saw a new broad sound to the west, running about northeast and southwest, which I quickly came to the conclusion must lead to the entrance of Markham Sound. Immediately below me was a good-sized island, about six miles long and two broad, with a narrow channel between it and the island upon which we stood. Our depot is evidently about twelve or fifteen miles southeast of the Dundee Point of Leigh Smith, which I could see in the shape of a long low spit to the south of me. A small island, which looks like a large low berg, lies to the west of the spit, and is, no doubt, his Eaton Island.

Owing to the bad going and the frequency of crevasses, I decided to get off the glacier into the new sound, but as the inclination of the ice-slope in that direction is very steep, I found it a difficult matter. As the crevasses were getting dangerous, I went on ahead to pick a way, leaving the others to follow carefully exactly in my footsteps.

The crevasses were now becoming very wide and numerous, being treacherously bridged with snow, and every now and then let one of my legs through as I stepped on them. But usually I could distinguish their outlines by a slight depression in the snow marking their course. I found that the farther I went north towards Markham Sound the worse they became, and I considered it to be too dangerous to try and take the ponies in that direction, so I returned to the others. On coming up to them I found the black pony down and floundering on the edge of a crevass, being partly in it, and it was with much difficulty we got him upon his legs again. There was nothing to be done but to turn in the direction of Dundee Point, almost directly south, where the angle of the slope is less, with fewer crevasses. I started off, followed by Blomkvist connected to me by a rope, to pick a way down; the doctor and Heyward following exactly in our footsteps with the ponies and sledges.

As we approached to within a mile of the sea the slope became less and the crevasses ceased altogether. Here we unhitched the ponies and left the doctor and Heyward to take the sledges down by hand on to the sea ice, telling them to put up their tent and to camp in the bend of the bay between the new island and Hooker Island.

Blomkvist and I then started back with the ponies to our camp

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of this morning to bring on the remaining sledges. After about four hours' plodding through some of the deepest and worst snow I ever waded through, and having to fairly drag them after us as they had got very sick of the entertainment, we got back. I then fed the ponies, but we could only get a biscuit for ourselves, as our cookers and food were on ahead with the doctor. As it is such very bad travelling over the glacier, I decided to retrace our steps of the 18th and get on to the sea-ice, and to follow the coast round Dundee Point to the place where I had directed the doctor to camp.

In coming down the slope near the depot one of Armitage's 13 ft. sledges with hay on it, which rides badly, was overturned and smashed, and had to be left where it was after removing the sovieks, etc., to the other sledge. A very stiff breeze from the northeast had got up just before we got back to the camp, with driving snow, which, together with a temperature of 20° below zero, empty stomachs, and feeling a bit tired, made frost-bitten noses and cheeks very much the order of the hour.

However, after seventeen hours' tramping we rounded Dundee Point, and reached the spot at 4 A.M. where I had told the doctor to camp, and saw to our great satisfaction their tent pitched. They bustled about and made cocoa for us and got us some food, which we were very glad of, and generally behaved like angels. We had had practically nothing to eat or drink for twenty-three hours, and were hard at work all the time, and in severe weather too.

A young she-bear put in an appearance soon after we reached camp, and proceeded to stalk us in the usual way, and made herself generally a nuisance. To get rid of her, as I did not want meat or feel inclined for a chase, I gave her three Lee-Metford bullets at from 150 to 300 yards distance. All three shots took effect, but she managed to get away up the ice-slope, leaving a trail of blood behind. When near the top of the slope, evidently thinking herself safe, she sat down and calmly surveyed us, her attitude being suggestive of a small boy "cocking snooks," but the third shot at 300 yards convinced her that her crowing was a trifle premature.

After feeding the horses and putting up our tent, we turned in at 8 A.M., having had twenty-five hours of it since our last camp, of which Blomkvist and I were marching most of the time. He

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and I tramped thirty-five geographical miles, pulling and hauling at ponies and sledges nearly the whole way.

April 20th, Saturday.—We turned out at 3 P.M., after about six hours' sleep, feeling all right again. I decided to camp, and to send the doctor and Blomkvist, who had dropped his pipe on the way here yesterday, and was anxious to look for it—pipes are treasures in these parts that can't be replaced—back with a pair of ponies and a reindeer sledge to ride half the way on, and a long sledge to bring on the hay which had been left behind yesterday, and part of the provisions from the depot, as I mean to move everything and make a depot near Dundee Point.

I occupied myself in repairing sledges, halters, etc., which badly required it, and doing a variety of odd jobs. All the rocks in this neighborhood are basaltic. Dundee Point would be quite clear of snow in summer; likewise the long island.*

April 21st, Sunday.—The doctor and Blomkvist returned with the hay and part of the depot at 4.30 A.M. After having some food, we all turned in and slept for seven hours. We then packed up and made a depot at the point of a stony ridge, where it juts into the bay. We deposited there fifty pounds of biscuit, fourteen pounds of boiled mutton, two gallons of spirit, tea, cocoa, sugar, milk, butter, oatmeal, and some small flags. It will be a great thing to know we have this depot in case of need. We also left there three pairs of ski, two ski sticks, and the broken sledge, for the doctor to take back with him to the hut. We marked the depot with a jack.

We passed the bold, square, isolated rock of basalt, standing in the bay between the island and Hooker Island, named by me Rubini Rock. Scott Keltie Island is flat, about one hundred feet to one hundred and fifty feet high, with low cliffs on the east side dropping precipitously into the sea.

There were many tracks of bears and foxes to be seen crossing the ice between Hooker and Scott Keltie Islands. We also saw four "mollymokes"† and a "dovekie." The ice to the north of the island is very recent bay ice with salt efflorescence upon it, with a frozen-up walrus hole; and I hardly like taking the ponies upon it. There was open water here not long ago. This ice has

*Since named by me Scott Keltie Island.

† Fulmar petrels.

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no snow upon it, and has a very wind-swept appearance. We camped at midnight near the bold rock * to the north of the island, as there appear to be no hummocks for some distance ahead to which we can tie up the ponies. The sky at the time of camping became overcast and misty.

April 22d, Monday.—We struck camp about 9 A.M., and passed the bold headland, travelling over level bay ice for some distance; but after passing the cape we came upon very hummocky stuff, with a large number of flat-topped bergs in every direction. This ice had evidently drifted into the channel last autumn and become frozen in.

It has been snowing and very misty all day, making it very difficult to pick a way through the rough ice. The new sound (named by me Robert Peel Sound, after the late Sir Robert Peel, Bart.) is bounded by high land on the east side, with frequent high, black, basaltic headlands jutting out of the glaciated land on that side. On the west side it appears to be low, and, with the exception of one cliff of weathered columnar basalt, † to be entirely ice-covered.

We stopped once in a march of fourteen and a-half hours for a short time, to make a pot of tea; and then proceeded up the sound in a northeasterly direction until 11.30 P.M., when we camped. The weather became worse as the day went on. Our course has been a very irregular one, owing to the rough character of the ice and dense mist, since passing the cape; although before that point was reached the ice was level bay ice, which wetted our fur boots with the salt efflorescence upon it. I fear a gale may break it all up and cut us off from returning.

We have passed many long, low, flat bergs in De Bruyne and Nightingale Sounds; and to-day were close to one about a quarter of a mile long, and standing from fifteen to twenty feet above the level of the floe. The doctor quite thought he had found a "paleocrystic floe."

April 23d, Tuesday.—Blowing a gale from the E.N.E. with falling snow, and driving it and the already fallen snow before it

* Named by me Cape Albert Markham, after Admiral Albert Hastings Markham.

† Named by me Guy's Head, in compliment to our doctor, who was at Guy's Hospital.

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furiously. We cannot see twenty yards from us. There is nothing for it but to camp until it clears a bit. The doctor and Heyward have to remain where they are, as they cannot start back to the hut in such weather. Their limit of time is now up.

The weather went from bad to worse as the day advanced, and towards evening blew a strong gale with blinding snow. Our tent is filled with it, and it penetrates everything, and things are a trifle uncomfortable. I hope it will clear up to-morrow, so as to let us get on; but the barometer is still falling. We passed the day crouched up in the tent, and occasionally going out to look for signs of the weather clearing or to feed the ponies.

April 24th, Wednesday.—No improvement whatever in the weather this morning. The tents and sledges are nearly drifted under; we shall have to remain where we are at present. I fear that the continuance of such a strong gale may break up the ice both north and south of us. There appears to be open water to the east of us, by the flight of flocks of looms in that direction. We have been obliged to remain camped all day.

The wind changed to north and dropped a little towards night, and we all set to work to clear the sledges of snow, and I repaired a sprung sledge. We find the hay very troublesome to carry, making the sledges top-heavy, and causing many capsize. I shall endeavor to dispense with hay in future. The long thirteen-foot Norwegian sledges are hardly strong enough for the rough work ponies give them with top loads, and I shall in the future use the nine-foot six-inch ones.

April 25th, Thursday.—Still blowing a fresh breeze, with a fall of temperature. Snow driving and horizon very misty. We struck camp about noon, and the doctor and Heyward, with a bay mare pony, left for Cape Flora, with orders, after taking two days' rest and refitting with ten days' provisions, to remove the remainder of the first depot and sixteen-foot boat to the other depot made on April 21st.

We (three of us and six sledges and three ponies) continued on our way across the entrance of Markham Sound, over very hummocky ice and deep snow. After proceeding about eight miles we found the channel widen out very much to the northwest, and we can see no land that way. The mist, however, prevents us seeing anything at any distance. The ponies, the bay in particular, are giving us much trouble by gnawing their halters,

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reins, etc.—in fact, everything within reach. We camped near midnight about four miles off the land to the east of us.

The country up here is quite different to what is marked in Payer's map. We find open sea where land is there charted, and islands in the place of main-land.

April 26th, Friday.—On turning out, the weather having improved, we took a meridian altitude of the sun for our position, and found our latitude to be $80^{\circ} 35' 20''$ N. I stop frequently to take bearings and to chart in the coast-lines.

A temperature of 20° below zero, and a fresh breeze, makes it a bit cool.

A wide sound runs southeast from here; doubtless the entrance to the Markham Sound of Payer. The sound divides at the eastern entrance, and a smaller channel takes a more southerly direction. Two rocky projections are visible at the eastern entrance, which from here look like islands separated by a channel. We passed over for the first four miles very rough ice, with deep snow evidently at least two seasons old; and then got out on more level ice, but with the snow still deep, but harder and very hollow, and much cut by the wind.

We travelled due north towards a high bold cape,* probably to the northwest of the Cape Fiume of Payer, and in the neighborhood of his Richthofen Peak, of which we see no signs.

Very high land is indistinctly visible to the west, at least twenty-five miles off. None at all can be seen to the northwest. A strait appears to run between this high land and Leigh Smith's Alexandra Land, but it may be that it is a bay surrounded by lower land, which at this distance looks like a water channel.

What has become of all the mass of land marked in Payer's map to the north of our position? None exists, and the salt sea takes its place.

I have decided to go direct north from here in the hopes of finding a practicable route in this direction, instead of going east into Austria Sound and following in Payer's footsteps. The horizon is very foggy towards Austria Sound, and by the look of the sky and by the flight of birds in that direction there is open water there. The whole coast-line east is studded with bold black rocks jutting out of an ice-covered land.

* Named by me Cape Richthofen.

A THOUSAND DAYS IN THE ARCTIC

We camped at midnight nearly abreast of the bold cape (Cape Richthofen), which we have made for. We did about fifteen miles direct. The temperature keeps about 20° below zero.

April 27th, Saturday.—We found a fresh breeze from the east blowing, with driving snow, when we turned out. Before leaving camp we took a meridian altitude of the sun, making our latitude $80^{\circ} 47' 18''$ N.

We started off, intending more closely to explore the cape, with the object of leaving the aluminium boat there and of making a depot. The breeze had now increased to a fresh gale, with dense driving snow, and finding the ice very rough indeed towards the cape, and as the small, wind-swept talus below the cliffs offers no spot upon which a boat could be left, without a great risk of its being blown away or of its being carried off by a high sea in the summer, I struck out again north along the glaciated coast towards a bold headland about ten or fifteen miles away—named by me Cape Fisher.

After passing a glacier face of about seventy feet high to the northeast of our morning camp, I saw in a small bay a spot formed by the lateral moraine of a glacier, which looks suitable for a depot, and struck eastward towards it. We put up the tent with great difficulty in the howling gale and driving snow, and proceeded to dig out a hole in the snow behind a large boulder, near the beach at the foot of the moraine, where we deposited the boat, protecting it with stones, both around it and inside. I also left there one week's provisions for three men, three horses, and three dogs. We had not finished our work until 3 A.M. on the 28th.

The lateral moraine is two hundred and fifty feet high and about six hundred yards wide, and is squeezed up into a wedge-shaped ridge. The glacier itself descends at a steep incline, between two high basaltic cliffs from two to three miles apart, from a domed hill about fifteen hundred feet high and two miles inland. Few crevasses are to be seen on the glacier.

The tidal rise and fall here is very small, and certainly not more than at Cape Flora.

April 28th, Sunday.—It blew very hard all night, with violent gusts of storm-force (force 11), with fiercely driving snow. Two of the ribs of the tent were smashed, and the whole tent was threatened to be swept away. We spent most of the night in

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staying it up, using the ice-axes and ski-sticks to do so, and sitting with our backs against the windward side to support it against the violence of the gale, as we momentarily expected it to go—a cheerful way for tired humanity to spend a night. After some hours of this little amusement, the wind decreased somewhat in force, and we lay down again and got a little sleep. When we turned out about noon, we found it still blowing freshly, with strong gusts, thick, soft snow falling, and the sky and atmosphere as dense as a hedge, so as to prevent us seeing more than fifty yards ahead at all, and nothing distinctly for more than twenty. We are having luck in weather! We shall have to remain where we are until it clears up a bit. Snowing heavily all day, but the wind dropped towards night. Armitage and I climbed to the top of the moraine to look round and to examine it. I found on the top a quantity of black lignite (showing the rings and grain of the wood very clearly) and some fossiliferous shale. I removed a considerable quantity for specimens. Also I found two botanical specimens, which I packed up for Fisher, one of which is *Bryum obtusifolium*, he tells me.

There are high cliffs behind the depot, on which I could hear little awks. I fixed a jack in some stones, about fifty paces southwest from where we buried the boat, and made our depot. I tied a label to the staff, and on it intimated that a note in a tin was at the foot of the flag. The latter I addressed to Mr. Harmsworth, with a request that the finder would send it to him, and I stated that three members of the Jackson-Harmsworth Polar Expedition had arrived there on April 28, 1895, and had left an aluminium boat and a week's provisions for three men, three ponies, and three dogs, fifty paces to southeast of the flag, behind a large boulder; and that we intended to try and push north from here through the undiscovered country without following Payer's footsteps up Austria Sound.

We find that by our observations and dead reckoning we are in latitude 80° 52' 45" north and longitude 4° 15' 24" east of Cape Flora.

April 29th, Monday.—A bear approached our camp at 2 A.M., just as we were finishing what we called dinner. He proceeded to stalk us in the usual manner, under cover of the hummocks and from leeward. At about eighty yards distant he hesitated, and delayed so long approaching nearer—neither would he go

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away—that I fired, and put a bullet in his neck and knocked him over, but picking himself up he started off, and I gave him a second in the hind quarters, and again a third in the flank as he slewed round. This again knocked him over, and he lay struggling on the ice for nearly a minute, when, to my surprise, he got up and made off again, covering himself with the hummocks, no doubt by accident, so that I could only see the top of his back, at which I fired, at about three hundred yards range, but without effect. He left the floe and crossed the glacier slope in a N.N.E. direction, leaving a blood trail behind him that could be seen for at least a mile. A bear's vitality is extraordinary! We should have been glad of his meat now. After turning in for a few hours we found the weather had cleared sufficiently for me to see what direction to take to proceed north. We started across the fjord or sound towards the high basaltic headland, Cape Fisher, lying nearly true north from the depot. The fjord is cut into four smaller bays, with points of land between, and we discovered the land upon which our last depot is made to be an island, as the sea runs through at the northeast point into Austria Sound. When about half-way across the bay, the black pony which I was driving ahead suddenly floundered into some wet boggy snow, with water in the deeper layers, out of which I got him with some trouble. Evidently the recent gales and the high temperature of yesterday have shaken the ice up, and the tides are forcing the water through the cracks. I fear another gale might break these floes up entirely and cut us off. There are lots of looms and mollymokes flying around, so that there will be open water here soon. The Zichy Land of Payer has practically disappeared from the map, and the land south of his Karl Alexander Land is only a mass of islands. No land can be seen to the northwest, only a large frozen sea. The channel up which we have travelled, and which is as wide as the English Channel, I have named the British Channel.

We camped at 10.30 P.M. about half a mile off and abreast of Cape Fisher, which is about five hundred feet high, around which large flocks of birds are flying. Here the basalt rises direct from the sea.

I stopped twice on the march to take angles and to make sketches of the coast-lines. We came about ten geographical miles.

SECOND SLEDGE JOURNEY, 1895

April 30th, Tuesday.—A fine sunny morning, but with a misty horizon. We took observations for longitude at 9h. 35' 9" A.M. (mean time at place) and a meridian altitude for latitude.

Armitage found the latitude to be $81^{\circ} 0' 38''$ N. We took second sights for longitude to mean with the morning sights at 3h. 59' P.M. About 3 P.M. the black pony, which I was driving ahead as usual with my two sledges, suddenly sank up to his girths in slushy snow and water, and we were both of us soon fairly stuck in it. I was wading about above my knees in slush and water trying to get him out, which after a time I succeeded in doing, but only to flounder into more in a minute or so. On the surface all the snow looked sound, and there was nothing to indicate this boggy condition.

The ponies driven by Armitage and Blomkvist were soon in a similar condition, and we had to take the bay pony out of its harness and drag the two sledges out through the knee-deep slush and water by hand on to firmer snow. We are making for an island* to the north, but we found that the farther in that direction we proceeded the more numerous became the cracks and the deeper the water and slush. I decided to go closer in towards the shore and to follow the land, for to proceed straight across the floes is simply out of the question for either the ponies or ourselves.

Just as we had extricated them and the sledges from a morass of slush, and I was marching ahead with my long ice-axe to sound the snow and to pick a way (there was nothing on the surface to indicate sound snow and ice from the swampy, and it was not until one stepped upon it that its treacherous nature was discovered), I saw a bear coming along on our tracks behind us at a fast trot. I returned to my sledge and got my .303 rifle, and took up a position by the rear sledge. He came straight up towards me with a rush, and not in the usually cautious manner adopted, and I remarked to Armitage when I was on the point of firing, who was a few yards behind me, "Did you ever see anything like this?"

At about thirty yards' distance I fired and shot him in the neck and tumbled him over, but he got up again and showed a very evident inclination to again make for us, but a second shot

* Mary Elizabeth Island, named by me after my mother.

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from me behind the right shoulder, as he showed me his flank, prevailed upon him to change his mind, and finally knocked him out. But although this bullet, as a subsequent examination showed, had penetrated his lungs and the upper portion of his heart, he ran twenty yards after receiving it. He was a large he-bear of remarkable boldness and determination, and one it would have been as well not to miss when firing at, or he would probably have made matters extremely unpleasant for us. We cut off some meat for ourselves and dogs, for which we were very glad. After this little incident, which put us all in a good humor, we struck across into the bay and followed the glacier face, meeting with swampy patches every now and then which gave us endless trouble, towards a low, much-weathered rock of columnar basalt, about six miles north of our morning camp, near which we camped.* Here also the basalt (columnar) rises directly from the sea. The bay pony has been going very badly for some days, and looks like a plate-rack. I fear she won't last out much longer. She evidently has not the constitution to stand this kind of thing. I took one of the two sledges yesterday which she was drawing and added it to the two which my pony has in tow. I fear our pony purchaser was much "had" in his deals, as the black is the only good one we have. It is rather risky work pushing on over these breaking-up floes, and I am afraid of losing the ponies through the floes becoming impassable for them, and these constant bogs will completely wear them out. They are always wet, or else their coats are hard-frozen; lumps of ice dangle from them, and they look more like white ponies than bay or black. A strong S.E. or easterly gale would very probably carry all this ice out, as there is no land visible to the north-westward, and by the flight of birds and the water-sky in that direction, there is evidently open water not far off out that way. Still I am very anxious to get farther before turning back. We have been travelling upon sea ice for some days now where land has been laid down. When one has formed one's plans on a supposed fact, which was the existence of a large body of land here, it is a trifle upsetting to find the fact a myth.

The thermometer has been down at zero again for some hours,

* This cape I named Cape McClintock, after Admiral Sir F. Leopold McClintock.

SECOND SLEDGE JOURNEY, 1895

and our fur-boots, breeches, and under-clothing are frozen as hard as boards as a result of our soaking. No one certainly expected such sloppy floes in April, although Payer met with a local patch in Austria Sound. It is horribly disappointing to have such a very short sledging time as this, and it quite prevents us going directly north farther this spring. It can't be helped, however. I can now only follow the trend of the land in a northeasterly direction. Anyhow we have got some depots ready for our next push north, and we have already considerably altered the existing map. Our position by morning sights for longitude are— $53^{\circ} 47' 7''$ E.; afternoon, $53^{\circ} 46' 37''$ E.; mean, $53^{\circ} 46' 52''$ E.; variation, $16^{\circ} 56' 30''$ E.; latitude of Cape McClintock, $81^{\circ} 8' N.$ by D.R.

Our faces present a most ludicrous appearance, being covered with scabs and cracks caused by frost-bites and the sun. We look fearful ruffians.

May 1st, Wednesday.—I took angles with a prismatic compass directly I turned out. Too much wind and an overcast sky prevented observations for position. The land trends to the northeast. No near land (except a small island—Mary Elizabeth Island—three or four miles off) to be seen to the westward; only a dull heavy sky in that direction, and birds are constantly flying that way. Apparently distant land is visible to the N.N.W., which looks like three islands.* After proceeding between four and five miles north, eighteen and a half miles east (magnetic) towards a bold headland,† I stopped and took further bearings and outlined sketches of the land. After proceeding a little farther I could see that the fjord running to the eastward evidently runs out into Austria Sound, possibly into the Back's Inlet of Payer, cutting up the headlands to the westward of it into islands, but the land is too high to see the exact connections from here. It would take weeks to thoroughly map this maze of channels and islands. It has been misty and overcast all day, rendering observations for position impossible. The bay pony has quite broken down and refuses even now to be led behind the

* Since named by me William Neale, George Harley, and Erasmus Ommanney Islands, after Dr. William Neale, Dr. George Harley, F.R.S. (since dead), and Admiral Sir Erasmus Ommanney.

† Named by me Cape Mill.

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sledges. After trying in every possible manner to get her forward, as she lay down every hundred yards and finally even after a long rest refused to move, I had to shoot her, poor beast. This is a serious loss.

The wind during our march got up from the eastward and had rapidly increased to a fresh gale with driving and falling snow and a rise of temperature, and we tramped on in a blinding, suffocating blizzard. There is evidently considerable open water to the northeast as well as to the west of us.

We camped about 10 P.M. in a furious gale and fierce driving snow, which gave us great trouble to get the tent up.

Our position by dead reckoning is—latitude $81^{\circ} 19' 30''$ N.; longitude $54^{\circ} 55' 32''$ E., and about three miles off the headland.

We have had very bad luck in weather and in the loss of a pony, also in the very early break up of the ice. We have, however, quite altered the map of Franz-Josef Land and opened up a new route north, and well begun our system of depots. Geographically we have managed to do some good work, but romantically we have not made a very great advance towards the Pole. After all, solid work and indisputable facts are of more value than pushing over frozen sea, and I feel convinced that there is little land to the north of us, and I doubt if King Oscar Land exists at all, or, any way, it can only be of small extent.

CHAPTER XI

SNOW MORASSES—DISCOVERY OF QUEEN VICTORIA SEA

May 2, 1895, Thursday.—Blowing a gale from southwest, with heavy falling and driving snow, and the temperature has risen to 2° above freezing-point. All our furs and equipment are sopping wet, so also is the snow on the floes. I consulted with Armitage as to whether we had better proceed farther, as we expect the ice south of us to break up and cut off our return, and we shall lose the ponies; and by risking it still further we can only follow this land a day or two farther along the coast, as an attempt to reach King Oscar Land—if such a land exists, which I much doubt—is quite out of the question now. Much of the ice we passed over farther south was very thin and light—bay ice, in fact. Armitage advocates an immediate return, and rightly so, I think, as I don't feel justified in further risking our ponies for the sake of a day or two's farther advance. Certainly nothing could look more threatening than the present state of things.

A she-bear and her cub, at least two years old, put in an appearance about 11 A.M., and walked deliberately up to our camp. At forty yards I fired two shots successively, aiming at her head, but to my surprise missed her with both. Still she and the cub stalked on quite unalarmed. I then discovered that in my haste, in pulling my "militza" off over my head, I had humped up my muffler and chin-guard around my right cheek, giving me a false view along the sights, and causing my bad shooting. I put this matter right, and as she wheeled round, having become alarmed by the barking of the dogs, I shot her in the hind quarters, breaking her backbone low down, but she scrambled on, and as she slewed round at about seventy-five yards distance, I put a bullet through her heart and finished her. The cub, however, had cleared out, but hovered around in the distance for two hours, and then walked up to the body of his mother, when I gave him

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a shot through the head at about eighty yards. The she-bear was still suckling the cub, big as it was.

It is still blowing hard, snowing and driving, with thick mist, which partially lifted occasionally. We shall have to camp and wait till it is a little better. We had one of the kidneys, fried with bacon, of the bear I shot on the 30th inst., for breakfast. I took some of the meat for future use. Our latitude is $81^{\circ} 19' 30''$ N., longitude $5^{\circ} 18' 18''$ E. of Cape Flora ($54^{\circ} 55' 52''$ E.).

We had now reached a point a few miles to the northward of the spot where Nansen, at the beginning of the following autumn, arrived, and where he made his hut. We were fortunate in thus being the discoverers of this new country and of the sea to the north and northwest, which I named after our Queen—Queen Victoria Sea. The Cape* where Nansen erected his hut some months later lay to the southeast of us.

May 3d, Friday.—Still snowing and blowing. Angry-looking water-sky to the east and northwest of us, suggesting strongly open water, and numerous birds are flying around us. Burgomasters† and ivory gulls are feeding on the carcasses of the bears I shot, and many mollymokes are skimming across the ice.

Inside the tent everything is sopping wet, and the snow on the floes is also very moist. The gear on the sledges, owing to a small fall of temperature, is now frozen stiff and very difficult to handle. The tent is nearly snowed under, and looks like an Esquimau igloo, and four of the sledges are completely hidden from sight in the drifts.

As the wind has decreased somewhat, although the falling snow and dense mist make the weather particularly vile and bad for travelling, I determined to make a move, as the longer we stay the worse the ice will get. So very regretfully we packed up to return southward, although we had hoped to have got farther north.

After digging out the tent and the sledges, we packed up as best we could in a driving snow-storm, and started back for Cape McClintock (our camping-place of the 30th inst.), where I intend to make a depot, as being in a more direct line for our advance north next spring than our present position, for on May 1st we deviated to the north-northeast to avoid the boggy ice.

* Named by me Cape Norway.

† Glaucous gulls.

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I am glad to find that our two remaining ponies draw their extra loads over the wet snow and deep drifts better than I had expected. I am afraid the high temperatures of late will prevent the cracks in the ice, caused by the spring tides, from freezing up again, and will thus further tend to disintegrate the ice. The sea to the north, I think, will be open in the summer, possibly sufficiently so for navigation. Markham Sound would probably be always blocked with ice, being so narrow. It may be possible in good seasons to reach here *via* Cape Lofley. If the *Windward* arrives in time in 1896, I should very much like to take a trip north in her, as a great deal of good work could be done in her.

We again got into boggy snow before reaching Cape McClintock. This snow was quite sound when we passed over it on May 1st, and shows the ice is getting worse rapidly. The weather attempted to clear about 6 P.M., and the wind became northerly with a fall of temperature, but the sky rapidly clouded up again, and it continued snowing.

May 4th, Saturday.—Blowing freshly, with a heavy fall of snow, when we turned out at 6.30 A.M. We set to work to make a depot in the cleft of Cape McClintock, leaving there nineteen small jacks, 15 lbs. of bear-meat, 11 lbs. of biscuit, 1 lb. of tea, 2 lbs. of butter, $1\frac{1}{2}$ lbs. of cocoa, three tins of milk, three cheeses (12 lbs.), 8 lbs. of sausages, 21 lbs. of bacon.

I also placed a jack on a prominent position on the northern side of the rock. We then packed up and got under weigh. We had not, however, gone a hundred yards before we sank above our knees into sloppy snow and water, with open cracks in the ice in all directions, and the ponies had to be dragged out by main force, and then the sledges afterwards. I found that by sticking close to the glacier face matters improved somewhat. I went on ahead, sounding the ice with my long-spiked ice-axe, but in spite of all care the ponies constantly floundered in up to their necks, and we had great trouble in pulling them out. Often there was no choice of roads, the snow being boggy in every direction. The floes are breaking up fast, and we have not turned back a moment too soon. I hope to get the ponies back in safety, for they are essential to our success in the future.

A fresh gale from the northeast blowing, with thick driving snow and a dense mist, adds to our difficulties. After proceeding about seven miles, and just past Cape Fisher, opposite our camp

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of April 30th, I tried to strike straight across Brown Fjord* towards Cape Richthofen, by which we had come, but we were soon involved in numberless morasses and open cracks. Having pulled out the ponies by their heads, we got them on to a firm patch of snow. They would struggle desperately sometimes, poor brutes, and then becoming exhausted, lie down as if quite prepared to die. We gave them a feed, as they were tired out, and made a pot of tea and had a little food ourselves. The gale is still raging, with fiercely driving snow, and the temperature is falling. I went on ahead as before, sounding, and by striking east up into the fjord and keeping nearer the land, managed to find a little sounder ice, but frequently the ponies floundered in up to their girths, and there lay until we pulled them out. Owing to the dense mist and driving snow, we were unable to see more than fifty yards ahead, and our horizon was bounded by a narrow misty circle.

At 10.15 P.M. we again got into very bad morasses, and the ponies, having become utterly exhausted, refused to move at all. So we stopped for an hour and fed them, and had some more tea—which is a splendid drink, a fine pick-me-up and friend—and some biscuit and butter. After which we again struck farther east towards the land. At 12.30 A.M. we got on to ice with less snow on it, and crossed the small bay at the head of which our depot and aluminium boat were deposited. I do not wish to touch anything, as the boat will be wanted here next year, and I hope now by making forced marches to get back before the ice necessitates a boat. We proceeded until 1.40 A.M., when we camped near the glacier face to the southwest of the depot. We had marched for twenty hours, and had travelled thirty miles, but not in a straight line unfortunately. The wind had become northwest and had cleared up the sky; the sun came out, and the snow stopped. This change is very welcome.

During the greater part of the day I had been obliged to steer by the direction of the wind, all land being shut out from view by the snow and dense mist.

May 5th, Sunday.—On turning out Armitage and I took observations for latitude, longitude, and variation. We hitched up the ponies and started about 2 P.M.

* So named by me after Captain Brown, the captain of the *Windward*. in 1896 and 1897.

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The ice soon became very bad. Wide cracks were open in all directions, and opposite Cape Richthofen were so wide as to become uncrossable without a boat. To get round these I struck farther in towards the land where the ice was fearfully rough and heaped up. Before doing this, I had tried to cross a crack with the ponies, when the black one went through the ice, a large piece having broken off. Armitage was driving and I was ahead sounding. I instantly ran back, and, seizing the reins, kept his head above water when I saw him go through, for he appeared on the point of drowning, till Blomkvist came up, and the three of us managed to drag him out upon the ice after much pulling and hauling. It was a very near go for him, and I certainly thought he would have been drowned. This has scared Mr. "Black" so much that he refuses now to budge an inch, expecting no doubt to go through again at the next step. To get on at all we harnessed the two ponies to one set of sledges, and by going three times over the same ground managed to round the cape and get clear of the villanous, sloppy, hummocky ice near it, and got on to smoother and firmer ice. Travelling in the Arctic is a fine trial of one's temper, and enough to ruffle a Job. The crack where the black pony went through was about two feet wide and the ice four inches thick, and farther out from shore widened to about forty inches. In spite of the trouble with the ponies at times, they are really invaluable, and I am thoroughly satisfied with my experiment of bringing them up here.

We stopped at midnight for a pot of tea and a little food, and then proceeded until 3 A.M. The temperature is again at 10° below zero, and our clothes and gear as stiff as sheet-iron.

I took bearings twice to-day and made sketches of the land in sight. To-day has been clear and fine—a pleasant change from the utterly vile weather we have had for so long. A long wide strait runs nearly south out of Allen Young Sound* and into De Bruyne Sound, cutting up Hooker Island; this I have named Smithson Channel, after the energetic secretary of the Tyneside Geographical Society. From the Austria Sound end of Markham Sound a fjord runs nearly southeast in the direction of the north point of Brady Island or Aberdare Channel, and it may be the northern entrance of Aberdare Channel.

* Named by me after Captain Sir Allen Young.

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After camping at 3 A.M. I again took a round of bearings and made sketches of the coast-lines. We travelled in all about twenty miles to-day. The whole sea west, northwest, and north appeared to be covered with similar ice, but with deeper snow. The current apparently flows to the southeast round the cape, and heavy ice is crushed against it.

May 6th, Monday.—Armitage and I took observations for latitude and longitude after turning out. The weather still clear and sunny. What a difference it makes to our spirits—and we seem to be able to do twice as much. The snow has a weak crust upon it which breaks at every step. On entering the southern portion of Robert Peel Sound, we came upon very heavy hummocky ice with deep snow drifts, at the bottom of which the sea had forced its way through cracks. Into these the ponies were soon floundering again, and we had to resort to the hauling out by the neck process to extricate them; we got as wet as on previous days. I stopped several times to take bearings and make sketches of the coast-lines. As I could see last night, Smithson Channel runs nearly south out of Allen Young Sound into De Bruyne Sound to the east of our first depot made on March 13th, reducing Hooker Island to about half its size on the maps, and near the northern entrance another fjord runs east towards Brady Island and Aberdare Channel. The whole coast-line is studded with numerous high, basaltic cliffs, except upon what is probably an island to the west of us, where the coast is one rounded-off glacier edge on the eastern side, excepting for an isolated columnar basaltic cliff, about one hundred and fifty feet high, which juts out of the ice near the entrance to the strait.

The land on this side is comparatively low. We camped at 3 A.M. about a quarter of a mile to the southeast of the columnar rock (bearing 306° magnetic from our camp). After having turned in for an hour two bears approached the tent, and the barking of our two dogs "Sammy" and "Sally" awoke us. It was blowing a strong breeze from the north with thick driving snow, so that when I tumbled out with my rifle I could hardly see them. They, however, disappeared without my firing and troubled us no more, allowing us to sleep in peace.

We travelled altogether to-day about twenty miles.

May 7th, Tuesday.—Before leaving camp we took observations for latitude and longitude under very disadvantageous circum-

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stances, as the wind was still strong and the snow was driving. I was, however, very anxious, if possible, to get a position fixed by observation here.

Cape Albert Markham, to the north of Scott Keltie Island, bears 107° magnetic from the camp.

We started towards the southwest point of the latter island over a level but a very boggy floe, and we were soon at the old entertainment of dragging the ponies out by the neck and the sledges afterwards; and are constantly wading about in a filthy mixture of snow and water above our knees. Open cracks run in all directions letting the water through, and the weak crust which the last two days has borne us, at least partially, has disappeared and now lets us through at every step. Near icebergs or large hummocks the ice is particularly bad, and the floes are beginning to take on a small-pox-like appearance. In another week these floes would have been impassable for the ponies, and possibly after another gale for ourselves too. Both Armitage and Blomkvist are affected very much with snow-blindness, and when we camped at 5 A.M. I too was slightly. I have walked ahead all day sounding with my long ice-axe to pick the best way for the others to follow with the ponies.

The light all day has been vilely misty, rendering it impossible to clearly see the snow at one's feet, and one stumbles on over rises and depressions like a person blindfolded, without being able to distinguish the difference, owing to the total absence of shadow or color. I think snow-blindness depends less upon the fierceness of the sun's glare than upon the intense whiteness of everything around. We look frightful ruffians with our faces covered with scars caused by the combined effects of the sun's rays and the cold, and they are very sensitive to cold winds. We appear shocking jail-birds in appearance.

We travelled thirteen hours, having stopped once for three-quarters of an hour to have some tea, cheese, and biscuit, and to feed and rest the ponies. We must get on, or, with the ice breaking up like this, the ponies never will reach Cape Flora.

Camped off the southwest point of the island, having travelled about twenty-three miles altogether. Our feet and legs have been sopping wet all day as usual. I think if there was much rheumatism in our constitutions this would bring it out, for without a fire it is impossible to dry soaking wet things. The

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temperature has been within a degree or two of zero Fahrenheit all day.

May 8th, Wednesday.—There were only thirteen degrees of frost when we turned out at 3 P.M. The weather is still very misty, and light snow is falling.

Our eyes are better for a sleep, but I insist upon Armitage and Blomkvist wearing goggles. As I have to go ahead to pick a road, I find I cannot do this with glasses on, and soon have to take them off. Soon after starting our troubles with the morasses began anew. A small sack of oats was discovered to have fallen off the sledges, which I sent Blomkvist for. He, however, returned without it, and I had a two miles' walk back before I found it. It was too precious to lose. The ponies have been floundering into deep wet drifts every twenty yards, and often less, necessitating our dragging them out by the neck as usual. They are getting quite played out, and the black especially has quite given in, and can only be got to move by very energetic measures on our part. The hummocks to-day have been very high and close together, with deep snow, and the bogs are worse than ever. Finally the black pony was taken with violent bleeding at the nose, which I stopped with great difficulty by cramming snow and waste up the nostrils. He was weak enough to begin with, so I am afraid this won't improve matters. I gave him three ounces of spirit, sixty over proof, to pull him together, but as he would not budge an inch—not from being drunk and incapable—I had to camp, which we did at 5 A.M.

We find that in the dense mist we have approached near the coast of a low, flat island (Eaton Island probably) about a mile long. I tried leather boots—my furs are so awfully rotten from wet—but got both heels raw from blisters. Our feet have been in a state of poultice for days from our wet boots, and this, and from not having worn any but fur boots since last October, makes our feet a bit soft.

We were eleven hours actually marching, and covered five miles direct.

May 9th, Thursday.—We started again at 6 P.M., and began by harnessing the two ponies in one set of sledges, taking them on for a mile, and then returning for the second lot. Constantly we had both down together in the morass-like snow, where they would lie and refuse to try and extricate themselves, and we had

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to drag them out singly with lines round their necks, the process being again repeated after going another ten yards. They at last got so fagged out by this kind of thing that there was nothing for it but to drag the six sledges ourselves, which we did for some time, taking them on by instalments, until we got on to somewhat better snow. We had frequently to go thirteen times over the same ground to get them forward.

About 4 A.M. we reached the shoal-like island, along which we travelled, as the snow was a good deal firmer on the land. It is about a mile long, half a mile broad, and from fifty to sixty feet high at the highest or northern end. The mist prevents us seeing anything more than two hundred yards off. I went on ahead trying to pick a way, but there is little choice, as all the snow is deep and soft with water under it. Occasionally, where the hummocks are fewer, there is harder snow, over which we go better. The ponies are quite played out, especially the black, and both frequently throw themselves down and refuse to move. We struggled on till 6 P.M., when we camped about three miles from the island. It is a race against time.

I have got very snow-blind, as I cannot wear goggles when picking a way, which I have to do during the march. I put them on as soon as we stop. I can hardly see at all now. Armitage and Blomkvist are now very much better. Snow-blindness is an inflammation of the conjunctiva, which becomes red and swollen. Tears stream from the eyes down the cheeks, and an intense smarting and aching sensation is felt, and sight is difficult. A weak solution of sulphate of zinc is the best remedy, and cocaine disks placed in the eyes to relieve the pain are useful for this purpose. The eyes must be protected from light for any remedy to be effective.

CHAPTER XII

A SUCCESSFUL RACE AGAINST TIME

May 10, 1895, Friday.—We took observations for latitude and longitude at 8 A.M., after arriving at camp, before turning in, and turned out again at 11.30 A.M. to take a meridian altitude for latitude. We then slept until 4.30 P.M., when we again took observations for longitude to mean those taken at 8 A.M. We find our position to be latitude $80^{\circ} 18' 58''$ N., longitude $50^{\circ} 41' 43''$ E. ($1^{\circ} 24' 16''$ E. of Cape Flora).

Armitage took bearings, as the mist had considerably lifted. I am absurdly blind, and can hardly take the times on the watch for the observations. I mistook a berg sixty yards off for land fifteen miles away, and felt annoyed with Armitage that he could not see it too, so difficult was I to convince that my sight was so defective, and it was some time before it struck him that it was the berg close to that I was looking at. From our camp Eaton Island bore 354° . Western extreme of Scott Keltie Island, 39° ; eastern extreme of Scott Keltie Island, 36° ; Cape Flora, $196\frac{1}{2}^{\circ}$; Cape Gertrude, $189\frac{1}{2}^{\circ}$; Windward Island, 213° .

Bell and Mabel Islands, Armitage tells me, are so covered with mist as to be doubtfully recognizable. Windward Island is also uncertain.

We started southwest about 7 P.M., with a strong breeze from southeast, causing a good deal of snow driving. I started again to try and pick a way, but found I was too blind to do so, and exchanged places with Armitage. I tried some empty oat-bags with hay in the bottom as snow-shoes for the ponies, and found that they much helped to keep them up. After going a mile or two the snow became firmer below the surface, and we got on faster, having gone about eight miles southwest. We changed our course to S.S.W. to hit the coast of Northbrook Island at Camp Point.

A SUCCESSFUL RACE AGAINST TIME

The southeast breeze had now increased to a fresh gale, with a heavy fall of snow, fiercely driving, rendering it impossible to see more than fifty yards ahead, and as the temperature keeps unusually low for a wind from this direction, after the high temperatures we have had, frost-bitten faces are again in fashion, making marching rather unpleasant.

After proceeding another eight or nine miles, we suddenly saw land close ahead, which we recognized as Camp Point, and immediately afterwards came upon the doctor's sledge tracks, outward bound, and the marks of three men walking beside the sledge. We camped close to the point at 6.30 A.M. The gale lulled for an hour, and blew in hard gusts of wind from all round the compass while we put up our tent, and it looked for a short time as if the weather would clear, but it came on as bad as ever soon afterwards.

We had a big feed, to celebrate our near return to the hut and the tolerable certainty now of being able to get the ponies back. This is an immense relief to me, as they are essential to our success here.

May 11th, Saturday.—We turned out about 3 P.M., and found the weather worse than ever, the tent half full of snow, and ourselves overspread with a thick covering of it. After having breakfast I decided to wait for it to clear up a little, as the strong gale and dense driving snow renders marching rather difficult. The sledges, tents, etc., were nearly buried out of sight, and one could not see more than twenty yards in any direction. So we remained in the tent, smoking and amusing ourselves as best we could, and occasionally tapping the aneroid in the hopes of seeing it rise. Our fast-rotting furs are causing odors not exactly resembling those of Araby. There we sat until 8 A.M. of the 12th, when it began to look more like clearing, so we had a second breakfast of oatmeal to get even with the day and ready to start. It, however, came on again, and blew and snowed as hard as ever.

May 12th, Sunday.—At 1 P.M. the wind moderated a little, so after digging out the tent and sledges we packed up and started for the hut down Miers Channel. This daily digging-out process is a great hindrance, as we often have to spend hours at this sort of work before we can start at all.

We had not gone far before we had both ponies down and

A THOUSAND DAYS IN THE ARCTIC

floundering in morasses of slushy snow, and the old entertainment of hauling them out by the neck began again. We found the extemporized snow-shoes useful, but they did not always prevent them from sinking.

To avoid the boggy floes as much as possible, I decided to strike across the bay and make directly towards Shell Gully and over the glacier, instead of going round the point of Cape Flora, as I felt sure the ice would become worse as we approached the point. After this matters improved, for although the snow on the glacier was deep, making it heavy going, it was a great improvement on the boggy morasses of the floes. When coming down the glacier slope opposite Windy Gully a reindeer-sledge took charge, ran away, finally overturned, and smashed an upright. We removed the load from it to another sledge, and left it to be fetched another day. On reaching the hut we found only two of the party there. The doctor, taking with him Child and Heyward, had left exactly a week previously with ten days' rations, to carry out my orders of removing the boat and stores from the first depot made to the one near Dundee Point and to make scientific examinations on Hooker Island, and had not yet returned. Bad weather had detained them at headquarters after their return from Robert Peel Sound.

A great many of the large, low, flat-topped bergs we have met with while sledging correspond exactly with Sir George Nares's and Dr. Moss's description of the so-called "floe-bergs" and "paleocrystic" ice-floes seen by them, both as to their formation and even to their partial salinity due to the wash of the sea. The "ship berg" was found so salt that we gave up using it, and sledged glacier ice from the land instead.

On many occasions I have noticed glacier faces with the peculiar stratification of the ice spoken of by Dr. Moss as occurring in "floe-bergs."

The ship still lies quite safe, and a quarter of a mile of fast ice is outside of her to seaward. There is, however, very little open water—only a few streams. All the sea from a quarter to half a mile from the land is full of loose driving pack. They have had nothing but one gale after another, with snow, since our departure, and much the same weather as we experienced farther north, except that we appear to have had it rather worse than they did. Fisher tells me that they have had worse weather since the 16th

A SUCCESSFUL RACE AGAINST TIME

of April than any they have experienced since reaching Franz-Josef Land.

Two of the bear cubs, "Mabel" and "Gertie," have died. They did well when we had them at the hut. "Benjy" does not look flourishing. Another cub has been taken on the talus here and is going on well. Perhaps this one will get home to the Zoo. Mouat is better.

We reached Cape Flora at 1 A.M. on the 13th. Much of the



A LOADED SLEDGE

snow has disappeared from Cape Gertrude, from evaporation no doubt, and by being blown away by the heavy and constant gales.

The results of our journey are :

That we have entirely altered the map of Franz-Josef Land, discovering islands and seas where *terra firma* has been laid down ; have been able to discover the most northern sea in the eastern Polar area, and to name it after our queen—Queen Victoria Sea.

We have discovered an entirely new and, from Cape Flora, a more direct route north, all of which we have mapped with all care, fixing the positions by means of observations for latitude and longitude, and determined the variation at six different positions.

A THOUSAND DAYS IN THE ARCTIC

We discovered at least two hundred and seventy miles (geographical) of new coast-lines.

We have conveyed north two boats, leaving them in positions where they are likely to be required in the future, and have made three depots to aid our next advance.

We have proved the utility of horses for sledging here, and have gained very valuable experience as to the state of the ice and the weather in the spring in this part of the world.

The conclusions I have come to as a result of our journey are:

That the ice breaks up north at an unusually early date, probably due to the perpetual gales during the second half of April and May.

That the high gales sweeping down off the land had kept parts of the sea open until after Christmas—such as in the neighborhood of Dundee Point and the entrance (southwest) to Markham Sound, and that there is probably open water off Cape Fligely all the year round off and on.

That most of the ice we travelled over clears out every summer, possibly, and even probably, rendering those seas navigable, but Markham Sound being narrow, would no doubt cause a block of ice there.

That ponies cannot be out after April 30th without a risk of being cut off.

That the advance to and retreat from the pole must be made during March, April, and May.

That ponies are *the* means of getting north.

That only a driving pack (open water) will stop us reaching a high latitude with a good supply of horses and luck.

That at least six horses are required, and *good* ones. I am asking for more to be sent out to me by the *Windward* in 1896.

CHAPTER XIII

BACK FROM THE SLEDGE JOURNEY, 1895

May 14th, Tuesday.—Arrived back at the hut at 1 A.M. this morning. Got a bad cold from sleeping in pajamas and blankets which had got very damp in my absence. My cabin also is very damp, the boards wet, and the walls covered with mildew.

We had been looking forward to the comparative luxury of the hut after our recent experiences sledging—change of food, warmth, clean clothes, and, above all, a bath. On our arrival, however, our spirits were a trifle damped by finding the occupants asleep, no fire in the stove, our clothing very damp, and no food cooked. We set to work, however, and soon remedied some of these defects, which were due to the hour of our return. Fisher and Burgess gave us a hearty welcome, and bustled about to make us as comfortable as the circumstances would allow. Our appetites are enormous, and will continue so for a week or nine days after our return to the hut. A “sledging appetite” became proverbial among us as being the largest thing in appetites known.

May 15th, Wednesday.—The doctor and his party arrived back at 7.30 A.M. after being away a week, having met with very bad weather, and in some places boggy floes, but, having come farther from the east than we did, travelled over better and sounder ice. On meeting with boggy places, however, they left two sledges with a seal's skin and other things upon them about seven miles beyond Camp Point (twenty-one miles from here) buried in a snow-bank close to the “Church Berg” (a berg much resembling a church), and came on with only one sledge, Child and Heyward using their “rueraddies” to keep the pony out of the boggy holes.

May 17th, Friday.—The doctor reports to me that there is another case of scurvy on board the *Windward*, which is still here.

A THOUSAND DAYS IN THE ARCTIC

A man who has had symptoms for several days showed his legs to him to-day. As he came up for medicine at 6 P.M. I examined his legs and gums, which bear unmistakable scurvy symptoms. He looks anæmic, is fairly well, but has no appetite. I had him stay for dinner here to insure his having fresh meat to-day. I afterwards went up the talus to shoot birds for the ship, but only got twelve looms.

May 19th, Sunday.—The doctor and Child, taking a team of eight dogs with one sledge and eight days' provisions, to provide against any possible detention, left about 8.30 P.M. to fetch in the sledges left behind. They should be back in three days with good weather. The sky, however, looks threatening.

As I noticed the looms flying in in large numbers from the sea and keeping low, I took my gun, and, accompanied by Burgess and Fisher, took my stand a short way up the talus to the eastward in the hope of killing a few for the ship. The looms were evidently making for the land for shelter in view of the coming bad weather. In three hours I had bagged eighty-three (Burgess killed eleven of them), and had lost at least twenty more through their falling at a distance among the hummocks on the floe, where we often failed to find them.

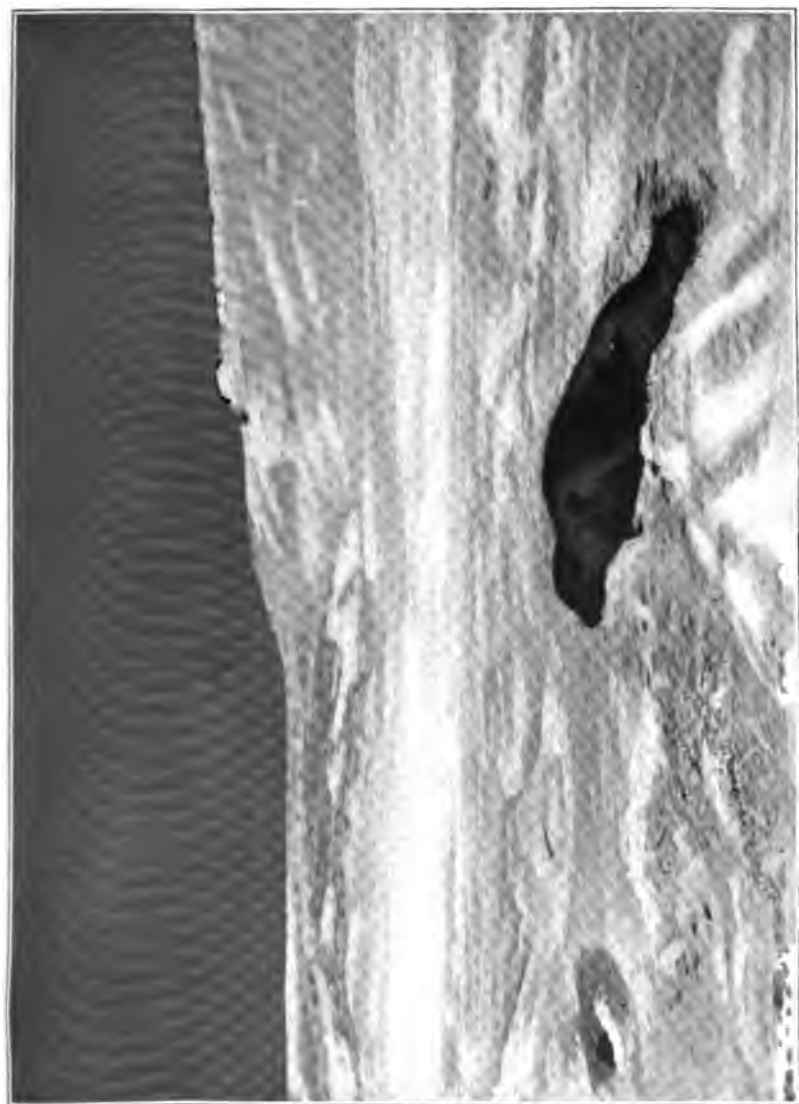
It began to blow from east-southeast with heavy snow before we finished.

May 21st, Tuesday.—Blowing and snowing all day. The doctor and Child are not enjoying themselves, I fear. May has given us the worst weather we have had since our arrival here, and has been the stormiest month. It has little resemblance to the weather associated with the month of May at home.

Weather: At 8 A.M. strong wind to moderate N.W. gale. At noon moderate gale. At 4 P.M. fresh N.W. wind. At 8 P.M. fresh to strong wind. Snow driving thickly throughout. Cloudy, misty weather.

May 25th, Saturday.—After dinner I went up the talus, accompanied by Fisher and Heyward, who undertook to act as retrievers, and shot twenty-five looms, which I intend to send to the ship.

From the top of the talus, 600 ft. above the sea, no ice whatever could be seen in any direction stretching from east through south to west. A little land ice hung off Bell Island and Cape Grant, but only open water could be seen beyond. I could see



THE "HARP" SEAL



BACK FROM THE SLEDGE JOURNEY, 1895

for a distance of quite thirty miles. The evening was quite clear—the first we have had for some time.

Weather: At 8 A.M. moderate N.E. wind. At noon gentle N.N.W. wind. At 4 P.M. light airs and winds from S.W. At 8 P.M. variable winds in force and direction. Fine, but cloudy weather. No ice to be seen from altitude of six hundred feet to S.E., S., S.W., and W.

May 27th, Monday.—The doctor and Child returned this morning about 11.30 A.M. with the sledge and seal-skin. They had been obliged to camp for four days, owing to the bad weather. The floes had become worse, but having dogs they could, as a rule, get along fairly well. Eight dogs, however, on hard snow will not do the work of one pony, or go along as fast. Dogs are preferable over rotten ice, as, being less heavy, they don't go through so easily.

The seal the doctor got is a "harp" (male). It had a hole in the ice near a tide-crack with water in it, about three hundred yards from the shore of the old depot on Hooker Island near a grounded berg, and the nearest open water, so far as we know, is off Cape Barents (twenty miles off) and the south coast of Northbrook Island. It was in rather poor condition, with only about three-quarters of an inch of blubber upon it.

Seals are anything but plentiful here, especially the "harp," and we have seen very few indeed since we arrived. The commonest species is the ringed seal or "floe-rat" of the Scotch whalers. These are very wary, and can seldom be shot on the ice. They are, however, easily approached in the water, but on being shot dead generally sink.

May 29th, Wednesday.—At 8 A.M. the dogs began to bark furiously. Armitage ran out, and returned in a few moments reporting that a large bear was on the point of going for "Räwing" and "Sammy," who were tied up outside. He took the Government .303 rifle and succeeded in killing it when on the point of seizing "Räwing;" "Sammy" had managed to break his chain.

During the morning looms were seen to be coming in from seaward and flying fairly low. I took my gun and, accompanied by the doctor and Fisher, climbed up the talus. In about two and a half hours I had bagged fifty-two; so our larder is looking up again. I sent most of these to the ship for the scurvy

A THOUSAND DAYS IN THE ARCTIC

patients. I have enjoined the greatest care with regard to the food used on board the *Windward*.

May 30th, Thursday.—Blomkvist, Maxim, and I removed a portion of the roof and found a quantity of snow between it and the ceiling (caused by condensation and being driven in through cracks between the boards). This we removed, and relieved the dripping condition of the interior of the hut, which was very uncomfortable, as water was leaking through the ceiling at a dozen different places from the thawing snow and ice beneath the roof, spoiling everything, and making the room below exceedingly damp. We got out a tarpaulin, which I mean to have battened down on the roof to keep out rain should it fall later on.

The others were engaged in various jobs. Fisher has planted some mustard and cress in a box, which he has placed on the south side of the house during a portion of the day when there is any sun, and which he hopes may grow. It took many days, and much care and trouble, to attain the height of an inch and a half, and then was devoured by us at one meal.

Bay ice and very light drift-ice now occupy the whole space which was open water a short time ago.

Weather: Calm at 8 A.M. Light airs and winds from S. and S.S.W. the rest of the day. Overcast cloudy weather throughout. Thawing rapidly and water standing in puddles.

May 31st, Friday.—About 4 P.M. a sailor came up to the hut and reported a bear. Armitage and I went out and climbed the floe-berg at the point, and saw him leisurely walking along the edge of the floe under the cliff slope, which he soon afterwards ascended towards the hut. I, however, met him at the top, and a shot from my .303 rifle settled him. He had at first approached the ship, and one of the men had blazed at him twice and missed.

June 1st, Saturday.—Shot a glaucous gull, weight 4 lbs.; stretch of wing, 5 ft. 2 in.; length of body from back to tail feathers, 2 ft. 6 in. It was a hen bird. I also shot an ivory gull.

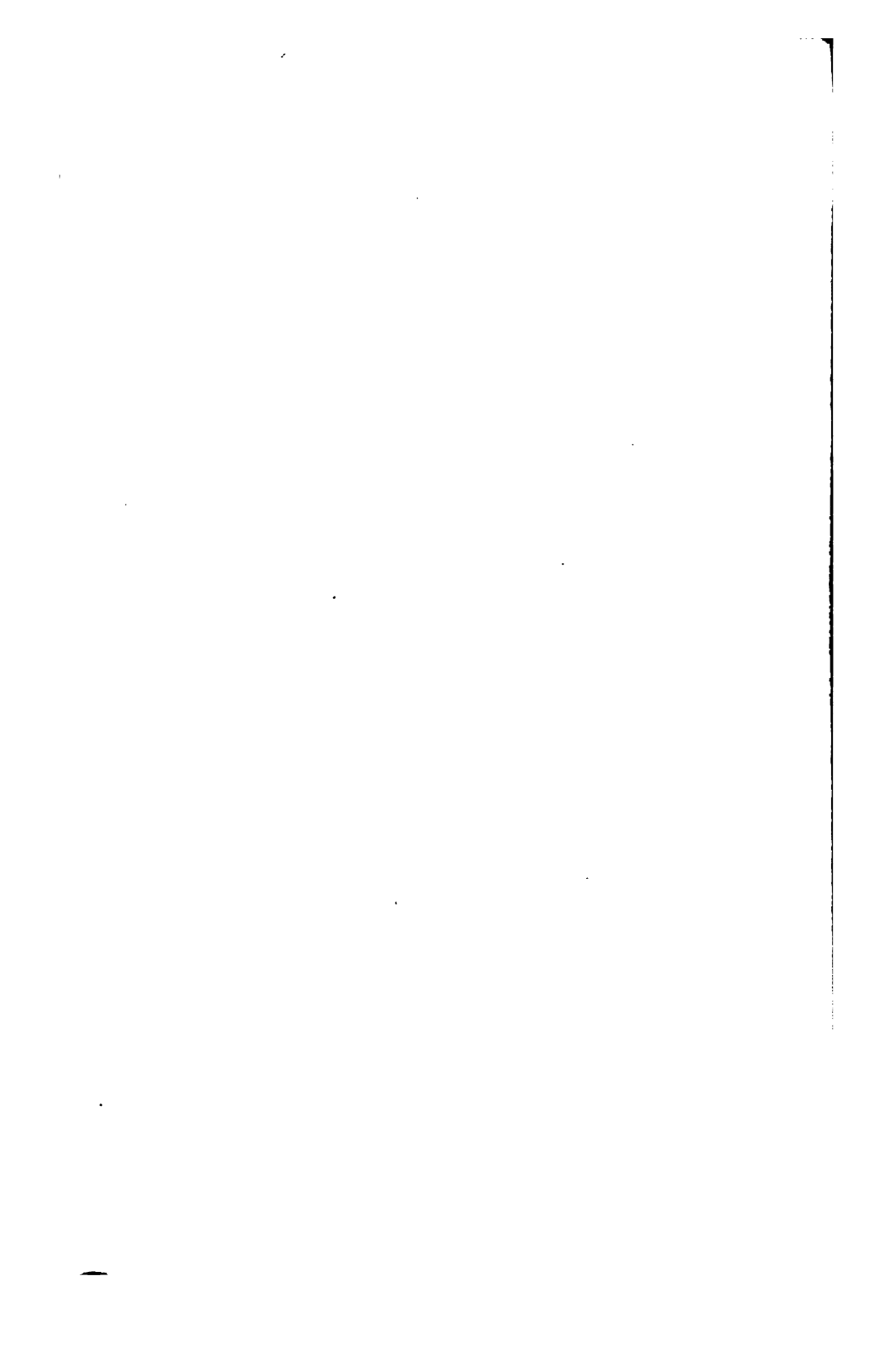
Armitage engaged in magnetic observations with the dip-circle.

Weather: Gentle N.W.N. wind throughout the day. Overcast and cloudy weather with mist at times.

A quantity of young ice away to the westward.



ARCTIC TERNS



BACK FROM THE SLEDGE JOURNEY, 1895

June 5th, Wednesday.—Writing letters. Some of the expedition engaged in digging out No. 4 hut.

Fisher obtained some annelids and shrimps to-day. Pools of water an inch and a half deep between the mosses.

Weather: At 8 A.M. calm. At noon and 4 P.M. light W.N.W. airs. At 8 P.M. calm and light airs from S.W. Overcast, foggy weather throughout.

June 7th, Friday.—Found a last year's bunting's egg on a piece of moss attached to a lichen, which is now soft and free from frost, under which a grub was found. I shot eleven looms, three kittiwakes, and a burgomaster gull. We noticed kittiwakes carrying moss in their beaks, evidently to build their nests with.

June 8th, Saturday.—Went out to kill looms, but none were in flight. I shot a species of tringa, which I believe is the purple sand-piper. Fired at two brent geese at midnight flying east.

Weather: At 8 A.M. gentle E.S.E. wind. At noon calms and light E. airs. At 4 P.M. light S.E. airs. At 8 P.M. gentle S.E. wind.

Overcast with thick fog throughout the day. Three hours thick snow between 8 A.M. and 8 P.M. This is our summer weather!

June 9th, Sunday.—Two dogs broke loose during the night, and murdered poor "Peter." He was found quite dead this morning.

The looms getting shy, and begin to know us. I shot a molly-moke near Leigh Smith's hut.

Weather: Gentle E.S.E. wind throughout the day. Overcast with thick mist throughout the day, and raw and cold. Verily the joys of summer!

June 10th, Monday.—Armitage shot two geese on the pond at 3 A.M. The expedition amused themselves with target-shooting at 200 yards. A rifle shooting-match in the evening between Child and the doctor. The latter won.

Armitage and I walked down to the ship, and while there a bear approached. I disabled her with a shot through the neck behind the left ear, which went through and out again. "Slop" fired at her, and once more made a mess of it. I put a solid .303 through both shoulders, breaking both, as the shot in the neck was not immediately fatal, and she was trying to make off. A third shot in the neck completely quieted her. A partly digested

A THOUSAND DAYS IN THE ARCTIC

seal and a loom were found in the stomach. Shot three tringas later on.

Weather: Light winds and airs from E.S.E. till 4 P.M. Calm the remainder of the day. Overcast, cloudy, misty weather throughout. The sun shining through mist at times. The snow in drifts fast melting.

June 11th, Tuesday.—Sunding is daily improving. Mouat now rambles in his talk at night, and imagines he cannot sleep without morphia, which the doctor several times has given him. I am feeling very anxious about him. His heart is becoming affected, and the dropsical condition is increasing. He is very depressed and says he has no desire to get well, poor old man. I fear he won't. His age is against him.

June 12th, Wednesday.—One of my men and I took our guns and walked west to look for the geese, which we saw yesterday. After dinner we went up the talus and knocked over twenty-six looms between us. Snowing heavily all the time. Heyward slipped down the talus with my gun in his hand, which he much damaged—scoring the stock and denting the barrel. He tried his best to save it and got damaged himself through his efforts.

We have been engaged in sawing out the ship all day with the large twelve-foot saw, which is suspended on shear-legs and worked by seven men. Lines running through a block being attached to the upper portion of the saw to raise it. It is forced down again by its own weight and by two men bearing upon a bar fixed across it at its upper end. It cuts very slowly the ten feet of ice around the ship—about a foot in half an hour, and rubbish thrown over the side of the ship and frozen into the ice much hampers us. A large quantity of bay ice has been forced under her to the depth of ten feet, so she lies in an icy cradle. To-day she slipped a foot away from the berg on the port bow, against which she appears to hold. The ice to the south is very light, and she could get away easily enough if at the water's edge. A good strong blow from the north would clear all the ice out and set her free at once. The land floes are very sloppy, with wide open cracks, and are dangerous to walk upon. It will soon be difficult to reach the ship. We are all using our long sea-boots now.

June 17th, Monday.—The doctor visited Mouat this morning and found him dead. Petersen had spoken to him at 3 A.M., and



SAWING OUT THE SHIP

BACK FROM THE SLEDGE JOURNEY, 1895

had given him some cocoa, when he went to sleep. The skipper had visited him at 9 A.M., when he appeared to be asleep. Poor chap, his trials and troubles are ended. His hopes and fears are done. He has looked for the last time upon that cold, desolate waste of ice and snow which has been our home for so long, and the grave in that white, silent land of the north will soon be the only memorial of our late comrade, who has aided us in the acquisition of knowledge, and in carrying our flag into the unknown. He was sewn up in a blanket, and the carpenter set to work to make a coffin. Several hands were directed to dig a grave a hundred and fifty yards behind the hut at the foot of the talus, close to a stream of thaw water. The ground was very hard, frozen a few inches below the surface, and picks and crowbars had to be used on the icy soil to make any impression on it. They worked hard, and no one spoke a word, each feeling probably how he himself might have been the one to be laid to rest in that silent, cold grave in the Arctic.

June 18th, Tuesday.—The crew at work at the stern of the ship with the ice-saw where the ice is weakest. Crowther and I thoroughly examined the ice between the ship and the water and found it very heavy with high hummocks, and offering no chance of cutting a way through it. There is about three-quarters of a mile of ice outside of the ship. It will break up in time, no doubt, if a swell comes in, and when the sun begins to affect it strongly.

Mouat was buried to-day. His coffin was conveyed up from the ship on a sledge, with the union-jack covering it, by the crew. All the expedition met it at the top of the slope, and we fell into couples behind the sledge. Poor Mouat! We did all we could to do him honor. The sledge was drawn by his shipmates, and there was something very sad as it glided over the ice-bound land. I walked behind with the captain, followed by the land party and the crew. When we reached the grave we grouped around it with bared heads, and the doctor read the burial-service. On the body being lowered, some of us threw in snow and frozen soil. The sight was a very pathetic one.

June 19th, Wednesday.—We have been at work sawing round the ship. I went up the talus in the evening and shot a few looms. When returning I saw a bear out on the ice. When on the talus I heard shots in the direction of the ship. I ran to the hut to get my .303 rifle and met two of my party, who had pre-

A THOUSAND DAYS IN THE ARCTIC

viously fired at him, but at a long range. I let loose "Räwing" and "Sammy," and put them on the bear's track, and they entertained him until we were able to get within about a hundred yards of him, past which there was no cover in the way of hummocks. A shot or two from us knocked him over, but unfortunately he fell through the ice, which was very rotten. We had to defer his removal till next day, as it requires a boat to get him.

June 20th, Thursday.—After breakfast all of us started off with a sledge and the twelve-foot Norwegian boat to get the bear that we had shot at midnight yesterday. I sent for "John" from the ship to go with us and to help with the skinning. We got the bear out of the hole after some trouble and skinned him on the ice. The floe is in a very wet condition, and we waded through water half way up to our knees a great part of the way.

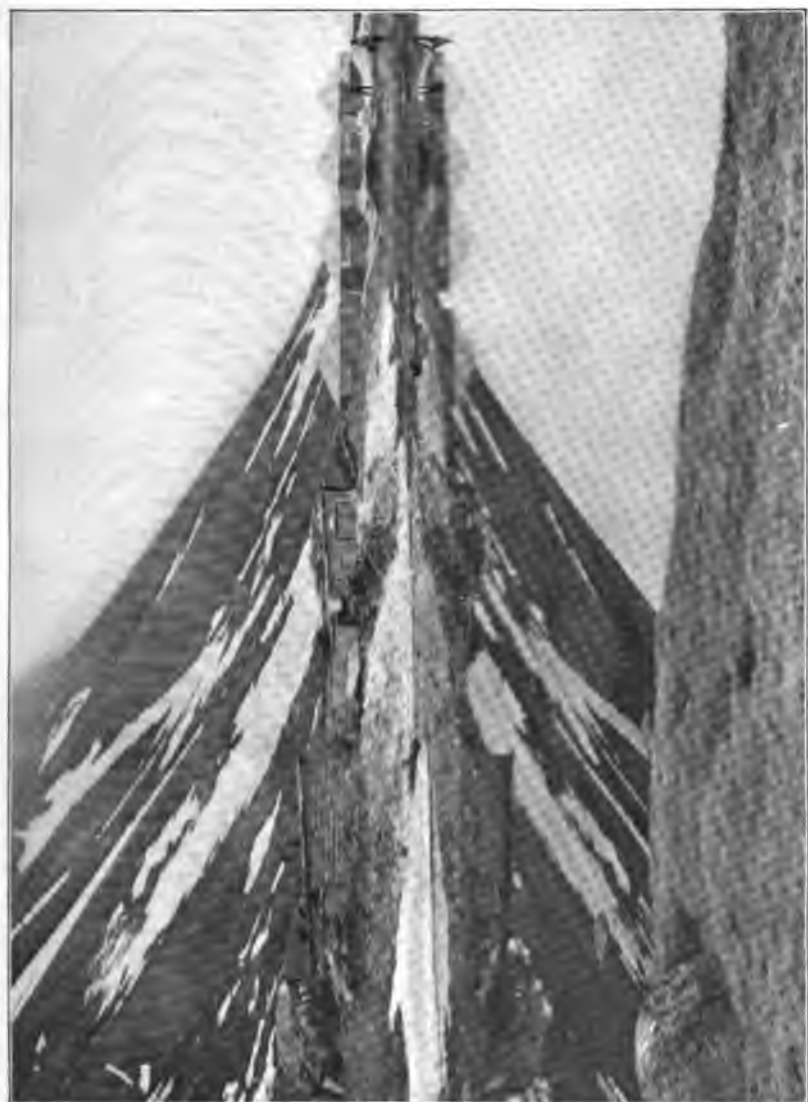
The ice immediately astern of the ship is thinner than that on the port side, being ice formed since April 4th. It was on this side we killed the bear.

We have been busily engaged in cutting round the ship. Wherever we don't want water it is to be found, but round the ship many days of hard work seem to have made comparatively small impression.

June 21st, Friday.—I again examined the ice from the water's edge to the ship all round. No cracks are noticeable. A swell or a strong gale from the northward would probably break it up. Sawing out is proceeding.

June 22d, Saturday.—Yesterday was the longest day. People at home are basking in the gardens, lying in hammocks, boating on the river, lounging about in the parks, or amusing themselves at Hurlingham and Ranelagh—while we are living in a world of ice and summer slush! One day is much the same as another, and as days and weeks pass there is little or nothing to break the dead monotony. An occasional bear is the only thing that does so. Here the sun is rapidly decaying the ice, and the bay floe to the south of the ship is hardly safe to walk over.

June 24th, Monday.—Six of us walked over the floe to Cape Gertrude. We found it very fearful walking, as we went without snow-shoes, thinking that the ice was sounder and better. The snow has a crust upon it which bears one for half a second and then lets one down suddenly up to the thighs, and sometimes to the hips with a sudden jerk into soft snow with a foot of water at



OUR SETTLEMENT ON JUNE 21, 1895

BACK FROM THE SLEDGE JOURNEY, 1895

the bottom of it. Coming back it was still worse, as the frost, after the sun had got low, made the crust a little harder, but not sufficiently so to bear us. It played havoc with our long leather boots. No boots suit this kind of going, fur ones are impossible, and any kind of leather ones are cut to pieces.

We found Cape Gertrude an exceedingly barren spot with very little vegetation upon it. A sandstone stratum with a thin seam of black lignite and fossils shows half-way up the talus underneath the basalt. Armitage shot a drake eider-duck, and I killed the duck after a lot of trouble as it flew, badly wounded, about a mile on to the villanous floe we had been wading over, and on my approaching it again flew a long way. I, however, eventually got within shot of it again, after wading through water and sloppy snow above my knees for about two miles. They did not appear to be nesting.

June 25th, Tuesday.—The ice around the ship shows further signs of breaking up. Sawing is still progressing slowly, as the ice is very thick and the amount of rubbish in the shape of empty meat-tins, cinders, etc., which have been thrown over the side during the winter, and which have become frozen into the ice, hinders and sometimes stops work. An old furnace bar was one of the little impediments that were met with to-day.

June 27th, Thursday.—A lane of water has opened up about three hundred yards astern of the ship. We can now see our way to get her free.

I took six of the members of the expedition down and manned the long saw on the starboard side, with Crowther and three of the crew. The rest of the men worked a shorter one in the thinner ice astern of the ship.

We cut parallel to the ship through ice about eight to ten feet thick as far as the fore-rigging.

At 8 P.M. Blomkvist ran into the hut to tell me that a bear was near the ship. I started out with my .303 rifle, followed by Armitage. I came upon him unexpectedly, close to the flag-staff, and killed him with one shot in the neck. He was a good-sized he-bear, and measured: Length along the belly, 8 ft.; length along the back, 7 ft. 8 in.; girth of chest, 6 ft. 1 in.; girth of belly, 6 ft. 5 in.

June 28th, Friday.—I took my chaps down to the ship again directly after breakfast, and we went on sawing with Crowther

A THOUSAND DAYS IN THE ARCTIC

and three of the crew. A hole was blown in the ice with a charge of about two pounds of blasting-powder in a bottle by means of a fuse. A hole of about five inches in diameter was bored into the ice to a depth of about four feet; a bottle containing the power with a fuse attached is then lowered into it. The hole in the ice above it is tightly rammed with stones, etc. We placed the mine just in a line with the "cut-water," to enable us to insert the saw in the hole, and then worked back to our cut of yesterday.

The doctor and "John" have been employed in skinning and weighing the bear shot yesterday. They divided it up and weighed each part upon a Salter's spring balance scaling up to 220 lbs. The total weight came to 808½ lbs., allowing fourteen pounds for fluids (blood, etc.) lost.

A clear channel between the ship and the open water was completed to-day, and we connected our cuts of yesterday. A good deal of ice was sawn away on the starboard side abaft the funnel.

The ship now only hangs in the ice from abreast of the main hatch on the port side away round the bows to within a yard or two on the starboard side of the cut-water. On being cut all round she will come away I think.

I hope to have the ship off in a day or two now.

June 29th, Saturday.—I went down to the ship at 8.30 A.M. to see how things are progressing. We worked at the ice on the port bow all day blasting and sawing.

Cleared away all the ice on the port side abaft of the fore-rigging. The shots fired to-day shook off much of the ice that was adhering to her sides.

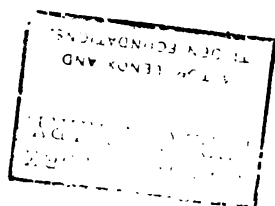
I went up the talus in the evening accompanied by Armitage and Burgess; to the latter I lent my gun to enable him to shoot. We killed thirty-five looms, which I sent to the ship for use on the voyage home.

As Blomkvist and Child had got forty-two looms' and kittiwakes' eggs yesterday we had some scrambled for breakfast. Some, however, were too much set upon to be eaten, not that we were very particular, as eggs even with a small chicken in are not to be despised in this part of the world, but those too much supplied with feathers we did reject.

July 1st, Monday.—I put the mails on board this morning, sewn



NEARLY FREE



BACK FROM THE SLEDGE JOURNEY, 1895

up in strong canvas bags, sealed and soldered up in a biscuit tin, and covered that with thick brown paper. This I placed in my cabin.

A strong swell is coming in from the southeast, which is rapidly breaking up the land ice. Gunter Sound and Miers Channel are now open. Eira Harbor is blocked with heavy winter ice, and a land floe extends from it for some distance to the eastward.

The doctor, Fisher, and Child left for Cape Gertrude at midnight, taking a sledge with a week's provisions, to collect firewood into heaps for removal later on, and to investigate further the geological formation and to botanize there. The sledge-load weighs about 300 lbs. They took "Räwing" and "Carlo" with them.

July 2d, Tuesday.—All the ice is now broken up to the seaward of the ship. She is now only held at the bows.

On going down to the ship late in the evening I found that arguments were in progress among the officers as to the best method of freeing the ship. Had a kedge put out on the ice astern and hauled tight with the winch, and an ice anchor on the starboard quarter removed, as it was jamming the ice in the cuts made by the saw.

July 3d, Wednesday.—At 1.45 A.M. the skipper called me to tell me that the ship was clear and ready to start. "Could he get things he required and go?"

I sent down to the ship a large quantity of flour, sugar, five gallons of paraffine, and some boxes of matches, for they have long been out of all these things, and our own stores have been much called upon. The sugar is a full ration for a month, and there is plenty of molasses and flour for six weeks and three days. I gave the skipper, after he had completed the soundings, the ship's chronometer carefully rated.

The *Windward* steamed away at 3 A.M., amid cheers from the five of us at the hut. We dipped three times what remains of the jack at the flag-staff which has been blown to ribbons. The *Windward* replied to our cheers by answering cheers, and dipped her ensign, and slowly disappeared in the distance. How we envied her! We turned in again till 9.30 A.M., when a dense mist obscured our view to seaward, but which cleared up about 2 P.M., when no signs of the ship were to be seen. The *Windward* get-

A THOUSAND DAYS IN THE ARCTIC

ting off is an immense relief to me; and that only one of the thirty-two men should have died. Sunding, however, certainly has scurvy.

I went up to the top of the talus about 5 P.M. to shoot a few looms for the larder. There was then no sign of the ship or of any ice at all to the south. I could see about thirty miles.



THE *WINDWARD* DEPARTING, JULY 3, 1895

Eira Harbor is still blocked with ice of a very heavy character, and a land floe extends across the eastern end of it to about a mile or more to seaward.

We are engaged in painting our whale-boat and in making preparations for our boat journey west, which, now that the ship is away and the ice broken up to near the shore, we can start upon. On examining our boat, by scraping the paint off, I find that she is very old and many of her timbers are quite rotten. I fear she will prove very heavy after she has been in the water. The other three boats on board the *Windward* are no better, and the carpenter is supposed to have selected the best boat for us, as our very lives depend upon her being seaworthy.

July 4th, Thursday.—After lunch I cleared a road through the bowlders which cover the plateau to get the boat down the snow



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BACK FROM THE SLEDGE JOURNEY, 1895

slope to the water's edge. I saw two eider-ducks (drake and duck) in the sea near the shore, and went after them in the twelve-foot Norwegian boat, but they were very wild and only gave me long shots at sixty yards.

This is the first summer-like day we have had. The thermometer is eight degrees above freezing-point (40° F.), and altogether we feel as if it were really midsummer, although one would consider such a temperature rather wintry at home. People at Hurlingham, or on the river, to-day, I fancy, would think so. I found two flasks (tin) of gunpowder in Eira Cottage, in very good condition, although they were standing in water. They were, of course, frozen into ice for nine months out of the twelve, but had been there thirteen years.

July 7th, Sunday.—The doctor, Fisher, and Child returned from Cape Gertrude about 11 P.M. this evening, and we gave them a hand to get their sledge up to the hut. They had found the glacier and the floe very bad travelling, and without snow-shoes would not have been able to get along at all. They had made an exhaustive examination of Cape Gertrude, and had collected all the drift-wood into heaps for future removal.

I went up the talus and shot ten looms for the larder and also two glaucous gulls for specimens.

We are still working at the boat, and have been busy pushing on our preparations to start west, so to-day we did not take the usual Sunday holiday.

July 9th, Tuesday.—We have all of us been very busy all day in getting out stores, sharpening harpoons, bending lines, etc., in preparation for our journey. The height of our ambition is to reach Cape Lofley, but we don't expect to do so, considering the difficulties Leigh Smith encountered in reaching, in the second year of his attempts, a position off Cape Neale.

It is evidently a dangerous coast to boat on, as it is only at long intervals, it appears, that it is possible to land or to run for shelter in bad weather. Perpendicular glacier walls elsewhere line the whole coast to a height of fifty to eighty feet, to judge by what we see from Cape Flora, and found on our way in here last year; also by what Leigh Smith tells us.

July 10th, Wednesday.—We ran the whale-boat down the snow slope, and launched her just below the flag-staff. I photographed her as she lay alongside a piece of land ice near the floe berg at

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that point. We have been engaged all day in finishing the preparations and in getting the stores and our equipment on board. I went up the talus and shot thirty looms for us to take with us. I am leaving the doctor and Heyward at the hut, the former as governor of Northbrook Island.

We shall leave about 11 A.M. to-morrow, when the tide changes and the ebb-tide begins to run west, as this will give us a good start.



THE WINDWARD STAMP

Made on Board

CHAPTER XIV

DRIVEN OFF THE COAST—NEARLY LOST

July 11th, 1895.—The whale-boat I named after Mrs. Harmsworth, as a slight mark of my esteem for her, and with the feeling that a more popular name could not be chosen with which to honor our boat. She is carver built, rigged with a mast, dipping-lug and jib sails, and measures 25 ft. 6 in. long by 5 ft. 7 in. beam, and undecked. We started with seven oars and an ice anchor in addition to our stores.

We left at 11.30 A.M. on the westerly ebbing tide with a crew of six, to try and pass Leigh Smith's farthest on the west coast, and to thoroughly explore and map the coast and various capes and to make collections as far in that direction as possible.

We took a month's provisions and about one hundred and forty pounds besides, of various provisions for a depot on Cape Grant, in case of an accident to ourselves or others.

I also took a 14 ft. canvas boat in tow to leave at Cape Grant to use in the event of our losing the *Mary Harmsworth* farther west. I also took "Nimrod," the bear dog, who is skipper of the canvas one, as he will be useful in finding us fresh meat for our larder.

We had a light north-northwest breeze for an hour, which then died down to a calm, and we had to row. We reached Bell Island about 7 P.M., but finding Eira Harbor full of heavy fast ice with the floe extending half a mile to seaward, we pulled round to the southwest side of the island, which we found also surrounded by land floe, and tied up to it, where we found a strong current coming out of Nightingale Sound, carrying ice with it, which much bothered us to keep the boat clear of. After some food Armitage and I walked over the floe to the island to explore. We found it very barren of vegetation and life generally, with the exception of looms, of which a good number were nesting

A THOUSAND DAYS IN THE ARCTIC

on the rocks; there were few other birds. I found a Richardson's skua's nest with two eggs, and shot one of the birds as a specimen, but the other cleared out on being hit with a stone. The eggs had young birds in them, and would soon have hatched.

They behaved much like plovers on my approaching their nest, but acted with more courage, swooping down at me within a foot or two of my head. They also hovered around and pretended to be wounded. The cock bird showed the most pluck. There were two eggs laid in a nest which was a mere hollow upon a slightly raised piece of ground and very difficult to see, as they closely resemble the color of the ground.



RICHARDSON'S SKUA

To our great surprise we found Eira House, a weather-board hut put up by Mr. Leigh Smith fourteen years ago, quite intact, with two small boats lying outside, very much in the same condition as he left it just before the loss of his ship, the *Eira*. Since then the silence of this spot has been unbroken, and articles left by him remained in the same

positions as he had placed them. The boats had opened considerably at the clinker seams, and a bear had torn a hole in the larger one.

The reason why Armitage and I failed to find it in March was that it was nearly, if not entirely, snowed under then, and if any part was showing at all it would look like a piece of ice. There

OUR WHALE-BOAT



DRIVEN OFF THE COAST

was a drift of snow fully four feet deep around the hut still, and the porch was blocked with snow and ice. There would be no demarcation in March between the low spit on which it is placed and the floe, as very great drifts form at this spot, and the land is low. The flag-staff on the roof was much gnawed by bears, showing that they had walked on to the roof from the surrounding snow-drift. We entered by the porch after much trouble, as the door had been blown open and snow had entered, which had formed into ice. The only letters we could find were two written by Lofley, in pencil upon the wall, and signed by him and some of the crew—the first, dated September 10, 1881, saying that they intended to try and reach Nova Zembla in their boats, leaving about June 21st, or else to wait for relief; the second was dated June 14, 1882, a week before they retreated south in their boats, when they came over from Cape Flora for stores. There were a few photographs on the walls of the ship's company. Our expectations were great on seeing a number of beer bottles ranged around the walls, for we were very thirsty, and had not tasted beer for long. These expectations were, however, short lived, for, alas! the bottles were empty. A few novels lay about, some nails, an empty gun-cotton cask, which I opened to see if it contained letters, as Crowther told me they had been left in a cask; a shovel, and the remains of a cooking-stove.

The hut is wonderfully well preserved and quite intact, excepting a few cracks in the roof and walls. We found an oar fixed in a pile of stones, showing scratches of bears' claws upon it, about three hundred yards to the southwest of the house. The site seems to me to be a very unsuitable one for a hut, but I expect it was the nearest point to the harbor to which Mr. Smith's party could approach with the ship in 1881, owing to it being blocked with ice.

We had a long and very tiresome walk back to the boat, as we had to cross the bay from the spit over a very wet floe, with water nearly up to our knees for two miles, to the land opposite. We got back at 3 A.M. We heard several glaciers to-day discharging bergs, giving forth sound like distant thunder. They appeared to be about six or eight miles off. We walked in all about six miles by the way we went to Eira House and back to the boat.

We slept in the boat, lying across the thwarts muffled up in

A THOUSAND DAYS IN THE ARCTIC

our furs. The space was very limited for six of us, and we must have looked very much like sardines in a tin. Occasionally through the night I turned out to see if the boat was safe, as she was lying in a very exposed position at the edge of the floe, and I rather feared ice coming down upon her with the change of the tide. However, the night passed uneventfully.

July 12th, Friday.—We let go from the floe-edge at 10 A.M. and as we had a little breeze from the north we washed ourselves and had our breakfast as we sailed towards Cape Grant, for I wished to make the most of it. The breeze, however, entirely died away in an hour or two after starting, so we took in the sails and had to pull against a strong tide running east.

After a long, heavy pull we reached Cape Grant at midnight, and found a snug cove for the boat to lie in in the remains of the land floe, under the cliffs on the southeast side. There is no beach at this point, as the sharp, jagged talus of basaltic boulders runs right into the water. The basaltic cliffs, much of which is columnar, appear to be about nine hundred feet high. The talus on the east side of the cape is covered with a luxuriant covering of mosses, scurvy grass, etc., induced by the manure from the birds (looms, mollymokes, burgies, dovebies, and kittiwakes) nesting on the rocks above and roches on the stony talus. I saw two foxes after our arrival (the first seen by us in Franz-Josef Land). They were small, lithe-looking animals about the size of a hare, with a white tail and a piebald body (piebald in large blotches).

They were possibly only just changing their coats for the summer. I tried for a shot, but they were too wary to allow me to get within distance. They uttered a peculiar harsh "quaaking" cry when alarmed, which I at first thought was a bird's. I found the remains of numerous looms, kittiwakes, etc., which had evidently formed their prey, around holes and crevices in the rocks. We pitched our tents upon the land ice just off the shore, and slept in our militzas, turning in at 4 A.M.

Twelve months ago to-day we left Greenhithe. I hope the *Windward* may soon be back there and relieve anxiety about us at home. We six are as well and jolly and as happy as can be, full of interest in our work.

July 13th, Saturday.—Armitage took an observation for latitude at noon, and having made a depot of eight days' provisions

NEARLY LOST

for six men, and leaving the canvas boat, we left with a northeast breeze for Cape Crowther.

We found a good deal of loose ice off Cape Grant, and Gray Bay full of fast land ice, except on the eastern side, down which a strip of water runs. Some very large bergs lie grounded off Cape Grant. A heavy pack lay off the entrance to Gray Bay on the west side, and rests against Cape Crowther. We struck out seaward towards the southwest and tried to round it. But the tide suddenly set into Gray Bay, bringing the ice with it, and before we could get clear, and in spite of our energetic rowing, the pack caught our whale-boat and nipped us between it and the land ice of Gray Bay. For a time things looked nasty, and we were in peril of being crushed. Fortunately a tongue of ice ran underneath her and squeezed her up, with all her fore part out of the water, otherwise she would have been crumpled up like an egg-shell. We thought she was actually stove in, and began to pass our provisions and stores out on to the floe in the expectation of her sinking when the ice eased off. It was essential to save all we could. We should have had to camp on the floe and then endeavored to reach the land. But having removed some of the goods and made a closer examination, we found the boat had escaped with the exception of being opened at the seams, and the oakum protruded in places. On the ice wheeling round we managed to get her clear of the nip. After getting the things back into her with all possible speed, we rowed with all our strength to get clear of a berg and the main body of the pack, which was fast coming down upon us. Once caught, twice shy, and a repetition of our late squeeze might mean an ending for all of us.

The wind had gradually died down to a calm, and in spite of our exertions we moved very slowly, owing to the weight in the boat, and a walrus which I had shot being towed astern, and which I did not wish to cast adrift unless absolutely obliged to save the boat and our own lives.

After about two hours' vigorous rowing, we got clear of the ice and reached Cape Grant about 11 P.M., where I mean to wait for a change in the ice before trying to reach Cape Crowther again, as at present it cannot be done in a boat. The thunders of discharging glaciers were constantly heard during the day. What a wonderful roar it is. In all this lifeless stillness the breaking off

A THOUSAND DAYS IN THE ARCTIC

of glaciers in discharging bergs sounds like a cannonade or thunder, and at times is quite deafening.

Armitage and I caught a young vixen in the evening among the rocks on the talus. There were two young foxes running about among the crevices of the bowlders, but although we tried for hours we could not get hold of the other one. The mother is a piebald animal with a white tail, a white patch on the near flank, and most of the body dark brown. She was, however, very shy, and I could not get nearer than about ninety yards. I got, however, a good view of her through field-glasses.

July 14th, Sunday.—The walrus I shot yesterday was a small cow, and measured : Along belly, from tail to muzzle, 9 ft. 1 in. Around abdomen, 7 ft. 8 in. Around shoulders, 7 ft. 5 in. Width of flippers, 1 ft. Length of flippers, 1 ft. 11 in. Width of back flippers, 2 ft. 2 in. Length of back flippers, 1 ft. 9 in.

Contents of stomach.—Pieces of basalt as large as marbles. A few shrimps. A large number of white elongated bodies (specimens preserved).

The bulls are very much larger.

Soon afterwards a she-bear put in an appearance, and began to eat pieces of walrus-meat which we had placed out on the floe for the entertainment of such visitors. I called Armitage, and we took our rifles and succeeded in killing her. We skinned the bear in the evening.

July 15th, Monday.—I am sending Armitage back to Cape Flora to fetch a "handy billy," and to bring the doctor, for whom I have room in the boat.

At 4 A.M. this morning I turned out, for we were still camped on the land floe, to see if our boat was all right and safe; but I found that part of the land floe had broken away and had come in on the boat, and was threatening to crush her.

I turned out all hands, and after taking everything out of her hauled her out upon the ice; we then made a "purchase" round a rock, and drew her up into a place of safety.

Armitage left with the boat at 2 P.M., when the tide began to set east.

Fisher and I went about two miles round the western side of the cape, and came across two Richardson's skuas. In trying to find their nest, while Fisher was looking for plants, I got a quarter of a mile ahead; and while so engaged I saw a large bear going



OUR CAMP ON CAPE GRANT, JULY 14, 1895

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towards him, who did not notice him, being busily engaged grubbing about on the ground. I shouted to Fisher and ran down between him and the advancing bear. I had the single-barrelled Henry rifle with me, and at about thirty-five yards distant I placed the first shot in his neck as he came towards me, having left Fisher, who retreated up the slope behind me. This, however, did not stop him, and he still came towards me with his mouth open, evidently a bit annoyed at his reception. I shot him again,



DEAD WALRUS—ON CAPE GRANT

this time through the face as he partly turned his head on one side; and then, as he wheeled round and made for the water, I put a third bullet behind his right shoulder. This, however, only stopped him for a few seconds, and, bleeding profusely, he took to the water and swam to a low grounded berg about four hundred yards from the shore, upon which he clambered after several failures. There he evidently died directly afterwards. I shall fetch him in the canvas boat as soon as the wind and swell go down sufficiently to enable me to do so. He is a huge he-bear. We afterwards found the Richardson's skua's nest. When returning to camp we found that "Mr. Bear" had followed our foot-

A THOUSAND DAYS IN THE ARCTIC

steps all the way up to the point where he overtook us, and had actually left the walrus-meat and blubber near the camp to track us. It is just as well we had a rifle with us. He was evidently a bit of an epicure, and viewed us as a delicacy.

It has been snowing and sleeting off and on all day, with a thick mist and generally very disagreeable weather.

The heavy pack-ice has closed in around Cape Crowther, and now lies against the portion of the land ice of Gray Bay that we sailed along the edge of on the 13th.

The soil on the southeastern side of the cape is kept damp in summer by numerous rills from the snow melting upon the rocks



RICHARDSON'S SKUAS (TELEPHOTO-LENS)

and ice-cap above, and well manured by the numerous birds—chiefly looms and mollymokes—which nest there. *Cochlearia Anglica* L. V. *fenestrata* Br. abounds on this side, and all plants are very luxuriant here.

On the western side is a corrie; at its base an old moraine, and below that again raised sandy beaches, upon which a few plants find a home. If there were as much sunshine on the western side, probably the flora would be richer than on the eastern. The rich soil seems to produce luxuriance rather than number of species. Mr. Fisher tells me he has found seventeen in all, including *Cerastium Alpinum* L. V. *uniflorum*. This last form is apparently confined to Cape Grant, where fine plants are plentiful in one place. *Cardamine bellidifolia* was in flower on July 15th.

NEARLY LOST

July 16th, Tuesday.—Sleeting and snowing, with a dense mist, nearly the whole day. There is still too much swell to fetch the bear in the small canvas boat, and our whale-boat is still away.

We read, smoked, and did odd jobs about the camp until about 10 P.M., when it ceased snowing and the weather became a little better. Fisher and I then went round Cape Grant to see if the ice upon which the dead bear was lying was still where it was, and to fetch the skua's eggs, which we had found; and I shot the two birds for specimens. To our annoyance we found the heavy piece of ice, which appeared to be firmly aground, had drifted away, of course taking our bear with it, and now was nowhere to be seen.

Fisher did some more botanizing, and we examined an old moraine, by the side of which the glacier had apparently once come over the cliffs above, but had now quite disappeared. We, however, found nothing of any particular interest. Some fox-holes were to be seen in the summit of it.

We then returned to camp and turned in. On the way back I shot a glaucous gull with the Henry rifle. There are now young looms, kittiwakes, and burgomaster gulls in the nests on the rocks. Nearly all the unhatched eggs have large birds in them.

July 17th, Wednesday.—We overhauled the depot we made here on July 13th on the southeast side of the cape. It is at the foot of the rocky talus, and about twelve yards from the water's edge, covered with large stones. Over the depot I placed a union-jack upon a bamboo staff. I left the following stores for ourselves or for others in case of emergency—the *Fram* people or some one else may be glad of them some day: 56 lbs. of biscuit, 14 lbs. of boiled beef, 13 lbs. of ham, 4 lbs. of butter, 1 tin of lentil, 4 tins of beef extract.

Below the flag, in a tin, I left the following letter, with a request that the finder would forward it to Mr. A. C. Harmsworth:

"Six members of the Jackson-Harmsworth Polar Expedition landed here on July 13, 1895, intending to push round Cape Crowther (the next cape to northwest of here) in their whale-boat the *Mary Harmsworth*. Finding Gray Bay full of ice (fast) up to Cape Crowther, excepting a narrow water-way on its eastern side, and a very heavy pack lying around Cape Crowther and right out to sea, they returned here on the 14th of July, after having their boat nipped and nearly crushed, to await a change in the ice before trying again.

FREDERICK G. JACKSON,

"Commanding the Expedition."

A THOUSAND DAYS IN THE ARCTIC

The weather still bad. Snowing at intervals, and overcast and misty. We were sitting as comfortably as possible eating our dinner of bear's-meat, cooked in our little stove, tea, and biscuit, when an unexpected wave arrived and nearly washed us out of our tent, scattering our things upon the waters. As the high tides are now swamping us, Fisher and I set to work to carry our things and pitch the two tents round on the eastern side of the cape, where there is a narrow strip of black sand. While so engaged the *Mary Harmsworth* hove in sight, with Armitage in charge, having been to Cape Flora, and brought the doctor. One of them had been sea-sick all the way, Armitage informed me with a grin as soon as the boat came within shouting distance, but they had had a fairly good journey. They also brought a 9 ft. 6 in. sledge which I had sent for, as I think it may be useful in exploring round Cape Crowther or elsewhere, if we find good firm land ice beyond. I received a letter from Heyward in reply to my directions installing him as Governor of Northbrook Island, assuring me of his intentions to do his best. I hear that his Excellency's appearance when last seen was not at all in accordance with his exalted position, which a little mending would improve.

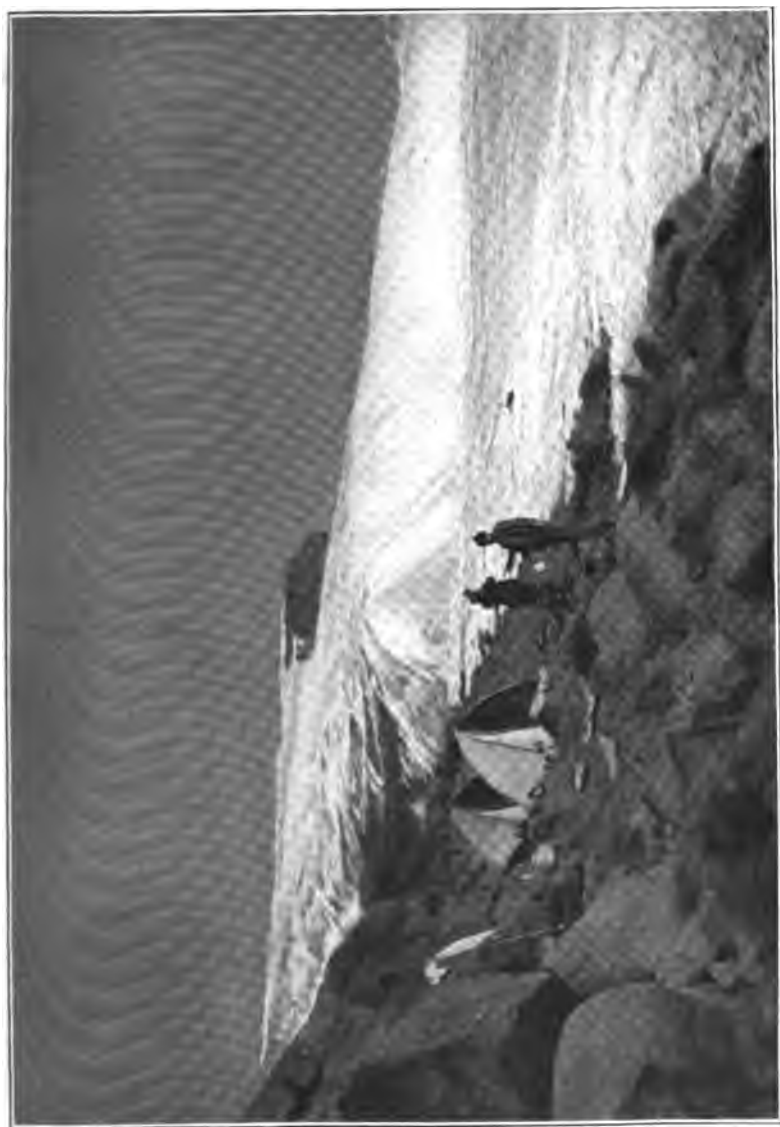
The young blue fox was killed this morning through pulling a stone in her pen down upon herself. This is quite distinct in appearance to the Cross fox of Waigatz.

July 18th, Thursday.—We took out the whale-boat with a dredge and tow-net, but we found the water around Cape Grant very devoid of life, and the bottom being stony, unsuitable for dredging. We only got a few red laminaria, shells, and shrimps. The water is very shallow for some distance to the east of the cape. I went out in the canvas boat in the evening in pursuit of a drake eider-duck, but found him too wild to get within shot.

The doctor and Fisher tried to reach the moraine between the two glaciers on the Cape Grant side of the rocks,* between here and Cape Stephen, over the land floe, but were stopped by an open lane of water and had to return.

July 19th, Friday.—Armitage, Child, and I ascended Cape Grant to-day by climbing up the glacier behind it. We found the height

* Named by me the Cooke Rocks, after Mr. Henry Cooke, H.B.M. Vice-Consul at Archangel.



TAKING OBSERVATIONS FOR POSITION AT OUR SECOND CAMP ON CAPE GRANT

NEARLY LOST

of the ice dome on the top to be a thousand feet by aneroid. The plateau around the top of the cliffs, which are nine hundred and thirty feet, was nearly free of snow. I collected a few mosses, a saxifrage, and a grass, but the vegetation is very sparse indeed there. *Draba Alpina*, L., *Saxifraga Cernua*, L., however, were noticeable on the summit, nine hundred and thirty feet above the sea. A fox "quaaked" at us from a pinnacle of rock above, as we ascended the glacier. We made a cairn of stones at the edge of the highest rocks on the southwest side, on which I fixed a union-jack on a bamboo staff. I placed a letter in a .450 Henry express cartridge-case, and tied it up to the flag-staff and closed up the end with the bullet. I stated in the note that we had ascended the cape, and that to-morrow we intend to try and reach Cape Crowther in our boat, the *Mary Harmsworth*.

All the ice seems to have now cleared away from Cape Crowther, although Gray Bay is still nearly full of fast ice, but some has broken away since the 13th. I could see now no ice of any extent either S.S.E. or southwest (except a circumscribed patch of pack to the southwest, about thirty miles off).

There also appears to be a channel of water leading right up to Cape Stephen. Nightingale Sound is still full of apparently unbroken ice. Its appearance rather belies its name; no singing bird ever warbled sweet notes here, I fancy. It is named, however, after Miss Nightingale, of Crimean fame. From the top of the cape we saw a large school of white whales coming from the direction of Cape Crowther and going east, but without stopping for a moment; we saw a few white whales once only after this. Blomkvist and I took two young burgies and a nest this morning on the rocks. He is trying to rear the young ones.

Eira Harbor is still full of unbroken ice.

Fisher and Blomkvist went out in the canvas boat to fish while we were away, but did not get so much as a bite. So we cannot have *Poisson à la reine* for dinner to-night. There is very little life in this blue water here.

I saw a large berg sailing quietly and peacefully along to-day suddenly break into a number of parts, simply fall to pieces, so to speak, and collapse in the sea off the cape. There are many largish bergs off here, some flat-topped, others pointed. I have, however, seen no bergs over seventy-five feet high since reaching Franz-Josef Land.

A THOUSAND DAYS IN THE ARCTIC

"Red snow" was very conspicuous upon the glacier between Cape Grant and the Cooke Rocks.

July 20th, Saturday.—As it was calm all morning I sent the doctor and Fisher over the glacier to examine the moraine they tried to reach over the floe on Thursday. They reported to me on their return that there is nothing of interest there. It consisted simply of broken-up basalt. The height of it is three hundred and twenty feet. The height of the glacier across which they walked is four hundred and forty feet. The face itself is about sixty feet. These heights are by aneroid.

A breeze sprang up from the north about 3 P.M., and after having some lunch we packed up and set out for Cape Crowther.

We took an observation for latitude at noon, but a cloudy sky prevented one for longitude afterwards. The constant overcast skies and mists have rendered astronomical observations very difficult to obtain.

We left for Cape Crowther at 4 P.M., and after getting clear of the headland we met with a very heavy swell coming in from the westward; the wind also was very changeable and fitful, now blowing nearly a gale with squalls and then falling dead calm. The boat shipped a good deal of water from the heavy swell and squalls. We reached Cape Crowther at 2 A.M. on the 21st.

We had to row a great part of the way, as the wind eventually quite failed us, which we found pretty tough work with a heavily loaded boat and a heavy head sea. We however met with little ice, and the sea appears practically clear to the west, southwest, south, and southeast. Much of the ice has now come away from Gray Bay, and David Island, which is very small and low, is quite clear. I intend to explore Gray Bay on our return journey if possible.

We camped on the southeast side of Cape Crowther on a shelving beach between the glacier which divides the rocks on that side and the point of the cape, and to the east of some low pillars of basalt which rise from the water's edge at the part of the talus on that side. We hauled the boat almost clear of the water by means of the "handy billy" made fast to a bowlder, and pitched our tents a few yards higher up.

After cooking some food we all went for a walk to explore and to collect anything of interest. No one has ever before landed on any of these capes.

There is a good wide beach here with small mossy pools; noth-

NEARLY LOST

ing of special interest was found, and Fisher tells me he has only collected fifteen species of plants. *Saxifraga oppositifolia*, L., is even scarce here. The rocks are of the prevailing basalt.

July 21st, Sunday.—Armitage, Blomkvist, and I made a cairn of stones upon the summit of the low rocks below the talus and close to the sea. Upon it I fixed a union-jack upon a seven-foot bamboo staff. In a tin at the foot of the staff I placed the following :

“ THE JACKSON-HARMSWORTH POLAR EXPEDITION.

“ Six of the members of the above expedition arrived here in their whale-boat *Mary Harmsworth*, from Elmwood, Cape Flora, on Sunday morning at 2 A.M., July 21, 1895.

“ We intend to endeavor to push round Cape Neale when we get a favorable wind. All well.

“ FREDERICK G. JACKSON,
“ Commanding the Expedition.”

Upon the flag-staff I tied an empty .450 Henry Express cartridge-case, containing the following written upon a strip of paper :

“ THE JACKSON-HARMSWORTH POLAR EXPEDITION,

“ *July 21, 1895.*

“ A letter is enclosed in a tin and hidden beneath the stones at the foot of this flag, which, having read, please forward to Mr. Alfred C. Harmsworth.

“ FREDERICK G. JACKSON,
“ Commanding the Expedition.”

It is blowing hard from the north and has been raining very heavily all day. We must wait for better weather before proceeding towards Cape Neale.

I notice that ice-bergs drift away towards the southwest from here, indicating a current flowing in that direction. I shall be interested in hearing the amount and condition of the ice on the eastern side of Spitzbergen this year. This appears to be an unusually open year on these coasts. The rocks on Cape Crowther are more extensive than those on Cape Grant, and on the eastern side bear a strong resemblance to the walls of an ancient fortress prison, with the basalt weathered into the shape of buttresses.

At the extremity of the cape the rocks rise to an altitude of about 900 feet. They extend only a very short distance on the western side, and the cape looks insignificant from that aspect.

A THOUSAND DAYS IN THE ARCTIC

The vegetation near our camp is very scanty. Two pieces of drift-wood have been picked up on an old sea-beach above the level of the present one by sixteen feet. On the latter none is to be seen, although it is favorable for receiving it. There are evidences of great ice pressure on the beach below our camp, and there are piled and crushed-up masses of ice still adhering to the land, being forced up on it in many places.

Looms are nesting upon the rocks at the point of the cape, and roches among the broken-up débris of the talus. Glaucous gulls, dovebies, kittiwakes, and mollymokes are also nesting upon the rocks. Blomkvist took two more young burgies on the low rocks near our cairn to-day. I also found a skua's nest with one egg in it, upon which the hen was sitting. This is the season for bird life. They will be leaving us in a few weeks for warmer and more favored climes. Upon the highest raised beach we found some silicified wood and silicified plant-remains, also chert containing vegetable matter.

July 22d, Monday.—It blew very hard and rained in torrents throughout last night (an unusually heavy rain for the Arctic regions), but cleared up about 10 A.M. I took the skua's egg and shot the parent birds for specimens. I secured several photographs, and Armitage and I took sights for latitude and longitude. We explored the cape and collected everything of interest. In the forenoon we started off for Cape Neale, pulling until clear of the cape. The light variable airs with which we started soon died down to a calm, and we had to row nearly the whole way.

We reached Cape Neale at 11 P.M., and pitched our camp upon a stony raised beach upon the southeast side of the cape, and pulled our boats out. There is a shallow bay between Capes Crowther and Neale nearly filled up with glacier. At intervals black rocks jut out of the ice between the two capes. We passed through two or three streams of loose ice on our way, but the sea appears open and free of any ice likely to stop us.

I took angles with the prismatic compass, as the atmosphere was very clear:

Cape Crowther, $150\frac{1}{2}^{\circ}$; Cape Ludlow, 310° ; Cape Lofley, 303° .

We also discovered a cape to the west of Cape Lofley, which I named Cape Mary Harmsworth (bearing 306°) after Mrs. Harmsworth and our boat. This cape is beyond the land seen by Mr. Leigh Smith. Both it and Capes Ludlow and Lofley appear

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from here to be without vegetation or beaches, and to be nearly overrun by the glacier behind them.

In a little port-wine we had brought with us, we drank to the health of Dr. Neale, who has always been a good friend to my expedition. We have achieved more in our little twenty-five-foot whale-boat than Leigh Smith was able to accomplish in two years in his ship. Showing how the seasons and ice conditions vary here, I find that his position for latitude of both Capes Ludlow and Lofley are not quite correct, but he viewed them from a point a considerable distance off the land. His mapping, however, is excellent and a model for discoverers.

July 23d, Tuesday.—We made a cairn of stones upon the upper of two prominent mounds upon the talus at the southeast point of the cape, and placed in a tin the following record, over which I fixed a union-jack:

“THE JACKSON-HARMSWORTH POLAR EXPEDITION.

“We, the undermentioned six members of the above expedition, arrived here from Elmwood, Cape Flora, in our whale-boat, the *Mary Harmsworth*, at 10.45 P.M. of July 22, 1895.

“We have landed upon all the capes between here and Cape Flora, leaving records and union-jacks upon each.

“We have carefully mapped, also, the whole coast line. We intend to endeavor to round Capes Ludlow and Lofley.

(Signed.)

“A. B. ARMITAGE.

“R. KOETTLITZ.

“H. FISHER.

“J. F. CHILD.

“K. BLOMKVIST.

“FREDERICK G. JACKSON,

“Commanding the Expedition.”

Cards of the various members of the party were also enclosed in the tin. I added: “Please forward a copy of this letter to Mr. Harmsworth, leaving this here.”

I made the tin, enclosing the above letter, fast to the foot of the flag-staff, and tied an empty .450 Henry Express cartridge-case to the staff three feet from the ground, containing the following note:

“THE JACKSON-HARMSWORTH POLAR EXPEDITION.

“A letter in a tin is buried beneath the flag and staff under these stones. Having read it, please replace it, and send a copy to Mr. Harmsworth. FREDERICK G. JACKSON, Commanding the Expedition.”

A THOUSAND DAYS IN THE ARCTIC

I shot a few rotches and dovebies for the pot. There are no looms here. There are a few pieces of driftwood (pine) on the shore, which we reared on end and fixed with stones. None is recent, and all were considerably above present high water.

After having lunch we cooked some "johnny-cakes" at a driftwood fire—the first fire we had had in Franz-Josef Land away from the hut. This was a red-letter day. The doctor and I about midnight climbed to the top of Cape Neale (about 700 feet high) by a gorge on the eastern side. We made a cairn of stones on the edge of the cliffs above our camp, concealing among the stones a note placed inside two 12-bore cartridge-cases.

It has been a dense fog all day at sea-level, but on the summit we got above the fog and found there the sun shining brightly. The effect of this was very curious. As we ascended the heavy mist became lighter and lighter, and gradually the soft rays of the sunlight made themselves manifest, until on the summit we were literally bathed in the sun's refreshing light. There were many yellow and white poppies (*papaver nudicaule*, *draba alpina*) in blossom and a few saxifrages. It surprised us much to find these flowers here, and the bright bits of color have a great charm. There is now no ice-cap immediately above the rocks, and the extensive flat plateau is nearly clear of snow. I found a quantity of fossil-wood there, showing the grain very perfectly. Some dark flinty specimens containing plant-remains and some dark stuff that looks like sinter. I shot two rotches and a burgo-master gull on the summit.

Owing to the dense fog near the sea surface I could see very little of the surrounding country, but when clear I shall have a splendid view to the west and northwest—in fact, all round.

I intend to return to-morrow, if clear, and take bearings and make sketches, and, if possible, to photograph the land to the west, northwest, and north.

During lifts in the fog we got good observations for latitude and longitude—both A.M. and P.M. sights for the latter.

Fisher has found six plants not before discovered on Franz-Josef Land on Cape Neale, and a new fungus or mushroom with umbrella-like ribs.

The southern side of Cape Neale has numerous small rills spreading along the lower beach, chiefly derived from the glacier. There are patches of grass of small extent. In one place where



CAPE NEALE, WITH RECORD CAIRN ON THE TALUS IN THE DISTANCE

A. J. L. LENOX AND
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the grass is well watered there is a carpet-like stretch of verdure, and among the grass and saxifrages were found *stillaria* in bloom, but only six plants. In no other spot does this plant flower. Here the *stillaria* is smaller than usual. *Luzula congesta* is also very small here. *Juncus biglumis* is finer here than at other stations and more plentiful. All these plants are confined to a space of twenty square yards.

Saxifraga oppositifolia is much scarcer here than on any other spot, and is not plentiful on any of the three most western capes (Capes Grant, Crowther, and Neale). There is more on the summit of the cape (700 feet) than on the beaches below. There is no apparent reason why this should be so, as similar soil is to be found on both spots. *Confervae* grow sparingly in a rill and pool of water on the summit, which do not favor the growth of any phanerogams.

July 24th, Wednesday.—I sent Armitage with Blomkvist and Child back in the boat to Cape Grant to bring up a week's provisions, as we are running short of many things and shall require more to enable us to round Cape Lofley. They left about 3.30 P.M.

Fisher, the doctor, and I then ascended Cape Neale by the gorge. We made a cairn of stones near the edge of the cliffs on the western side, among the stones of which we placed a letter in a tin tied to the bottom of a piece of drift-wood, cut into the form of a flag-staff and fastened a jack to it. In this letter I stated we three had been engaged in taking bearings from the top of Cape Neale and in making sketches of the country to the northwest, and that we had discovered a cape beyond Cape Lofley to the westward. To-day I could confirm this discovery.

On the summit of the cape we noticed over a large area narrow cracks in the soil, pentagonal in form, which we agreed were probably caused by and correspond to columnar pillars of basalt below the surface.

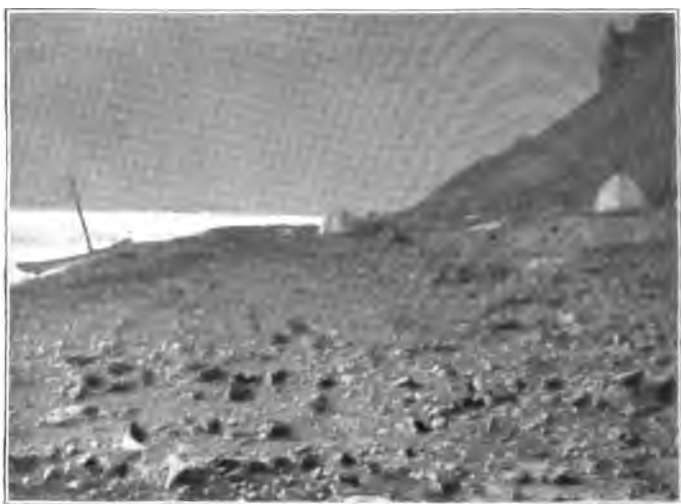
Nordenskjöld noticed apparently somewhat similar markings of a six-sided character on Cape Chelyuskin.

We sketched the bay between Capes Neale and Ludlow and the whole coast line, and took bearings of all noticeable points. The mist lifted sufficiently for us to do this, but rendered the land beyond Cape Lofley rather indistinct. We could, however, very definitely make out the outlines of Cambridge Bay, which

A THOUSAND DAYS IN THE ARCTIC

was full of ice. The land to the westward appears to be one large glacier with a few small faces of rock jutting out of the coast line at long intervals. Only little detached ice can be seen from here to seaward. I measured Cape Neale to be 700 feet, the upper 250 feet of which is basalt. I photographed the cairn and also Cape Crowther from the top. Found a very old seal's skull and some vertebræ of a seal on the plateau of the summit which I am preserving. I shot a few dovekies and a tringa* when up there.

If I only had the *Windward* now I might push a long way to the westward—what a chance! A small glacier runs down be-



OUR CAMP ON CAPE NEALE, JULY, 1895

tween the cliffs on the west side of the cape, and we amused ourselves by bowling stones down it from the rocks above. The two young burgomaster gulls we found this morning had escaped from their pen in the night and were found swimming on the sea when we turned out; we, however, recaptured them.

We have been using scurry grass (*cochleria fenestrata*) as salad during the last month, as there is a good quantity on all these capes. We find it excellent.

* Purple sand-piper.

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I have shot four purple sand-pipers here.

The land to the westward appears to be more Arctic even than to the eastward, and nothing can be seen but glaciers flowing seaward from very high land, with a few bare faces of rock jutting out of the ice like nunataks, and all but completely overrun by it. No beach is apparent at either Capes Ludlow, Lofley, or Mary Harmsworth. The tide flows east and west along the land here, but at slack-water no current near the land is perceptible. Bergs, however, go off to the southwest at a distance from shore.

I hope next summer to bring the *Windward* round here if it should be a similar season to this as to this ice. I think that probably in another week or so a ship could pass right up Cambridge Bay by the bold headland to the northward, named by me Cape Fridtjof Nansen. This may be a route to King Oscar Land by ship, if such a land really exists.

Bearings from the plateau on the summit of Cape Neale. Highest level (west side):

Altitude 700 feet by aneroid. July 24, 1895. Extreme point of cape west of Cape Lofley, 279° (Cape Mary Harmsworth). Point of Cape Lofley, $280\frac{1}{2}^{\circ}$; point of Cape Ludlow, $287\frac{1}{2}^{\circ}$; throat of bay, 307° ; low rock, $314\frac{1}{2}^{\circ}$; west extreme of black rocky cape, 343° ; east extreme of black rocky cape, $347\frac{1}{2}^{\circ}$; rock in northeast point of bay, $357\frac{1}{2}^{\circ}$; Cape Crowther, 125° ; rock in bay between Capes Neale and Crowther, $107\frac{1}{2}^{\circ}$.

Cape Mary Harmsworth is, I believe, very possibly situated on Gillis Land, said to have been sighted by Captain Gillis in 1707. Nordenskjöld evidently believes that Petermann had no justification for placing the rather mystic Gillis Land in its present position. This point ought now to be decided.



PURPLE SAND-PIPER

A THOUSAND DAYS IN THE ARCTIC

On the summit *papaver undicaule*, *draba alpina*, L. ; *cochlearia anglica*, *stellaria* sp., *saxifraga oppositifolia*, L. ; *saxifraga cernua*, L., and *saxifraga rivularis* were noticeable.

July 25th, Thursday.—Fisher and I walked round to the western side of Cape Neale to see if the young glaucous gulls which yesterday, from the top of the cape, we saw upon a pinnacle of rock half way up the cliffs can be reached.

After a difficult and rather dangerous climb I managed to reach the pinnacle upon which the nest was, which was about one hundred feet above the top of the talus. I secured three young ones, apparently all belonging to the same nest, but this had been kicked or blown away. At first only one old bird was to be seen, but another joined it after I had been there a time. The young ones on my approach retreated to the extreme of the crumbling edge of the cliffs, and on my attempting to secure the third it overbalanced itself and fell over, and I all but followed it. Its wings were, however, apparently sufficiently developed to save it from fatal consequences by parachuting it down in spite of its hundred-foot tumble, as I picked it up on the ice-slope below, apparently uninjured. The old bird showed great boldness on my approaching the young ones, and swooped down at me within a foot of my face.

I shot three buntings (two young ones which could fly well, and an old cock) as specimens, and a number of rotches for the pot. There are no looms on the rocks here.

It has been a dense mist all day and a cold, raw atmosphere.

July 26th, Friday.—A dense mist and fine rain all day, changing to snow in the evening. A heavy swell is rolling in on the beach from the southward. Evidently it has been blowing hard in that direction, but it hasn't reached here.

We could do very little here to-day, and the time has been chiefly spent in sorting specimens, smoking, cooking and eating our meals. I hope the boat will soon be back, as I am anxious to push on to Cape Lofley.

July 27th, Saturday.—Fisher and I went up the talus on the western side and I photographed the glaucous gulls' eyrie where I got the young ones on Thursday.

Armitage returned about 2 P.M. in the whale-boat. He had been much delayed by a gale from the south, and a heavy swell caused by it, at Cape Grant, and had to wait there. Also ice



THE RECORD CAIRN ON THE TALUS OF CAPE NEALE

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NEARLY LOST

coming out of Gray Bay proved troublesome. They brought the week's provisions and also various other articles required. The doctor and I went up to the summit of Cape Neale in the afternoon to fetch the prismatic compass-stand which I had left up there in the hopes of the mist clearing and enabling me again to take bearings. The mist to-day is very thick and much ice lies off the land, having come out of Gray and Cambridge bays. I intend to start for Cape Lofley to-morrow.

The doctor came to me after the return of the boat in great glee, and extremely delighted with himself and with the world in general, to tell me that one of our crew has "made himself ill by eating too much and has a temperature of 102°."

He had excited great wrath by taking away some food by mistake in the boat belonging to the doctor's tent. Hence possibly his diagnosis of the cause of the sickness! The incident caused much amusement and laughter, in which even the unfortunate patient joined.

July 28th, Sunday.—I placed the following letter in an empty one-gallon spirit tin, and buried it under a cairn of stones on the site of our camp:

"THE JACKSON-HARMSWORTH POLAR EXPEDITION.

"The boat with a week's provisions having returned from Cape Grant, we are starting this morning in the *Mary Harmsworth* to endeavor to reach Cape Lofley. We have also discovered a cape to the westward of Lofley which we may proceed to before returning. We have established two cairns containing letters on the summit (700 ft. by aneroid), one with a union-jack over it. And also a cairn with a union-jack above it, and a letter in a tin on the pointed ridge of the talus looking northwest from here (being on the northwest from sky-line of the talus from here).

"We are all well.

"FREDERICK G. JACKSON,
"Commanding the Expedition."

We left Cape Neale about 11 A.M. and rowed round the cape to clear a lot of drift-ice, and then set sail across the bay. After proceeding some distance Cambridge Bay began to open out, and we could clearly make out the large bold headland, Cape Fridtjof Nansen, with pockets running up on either side forming a prominent cape. On the northern side the water appears to run out in the form of straits connecting Cambridge Bay with sea to the northward.

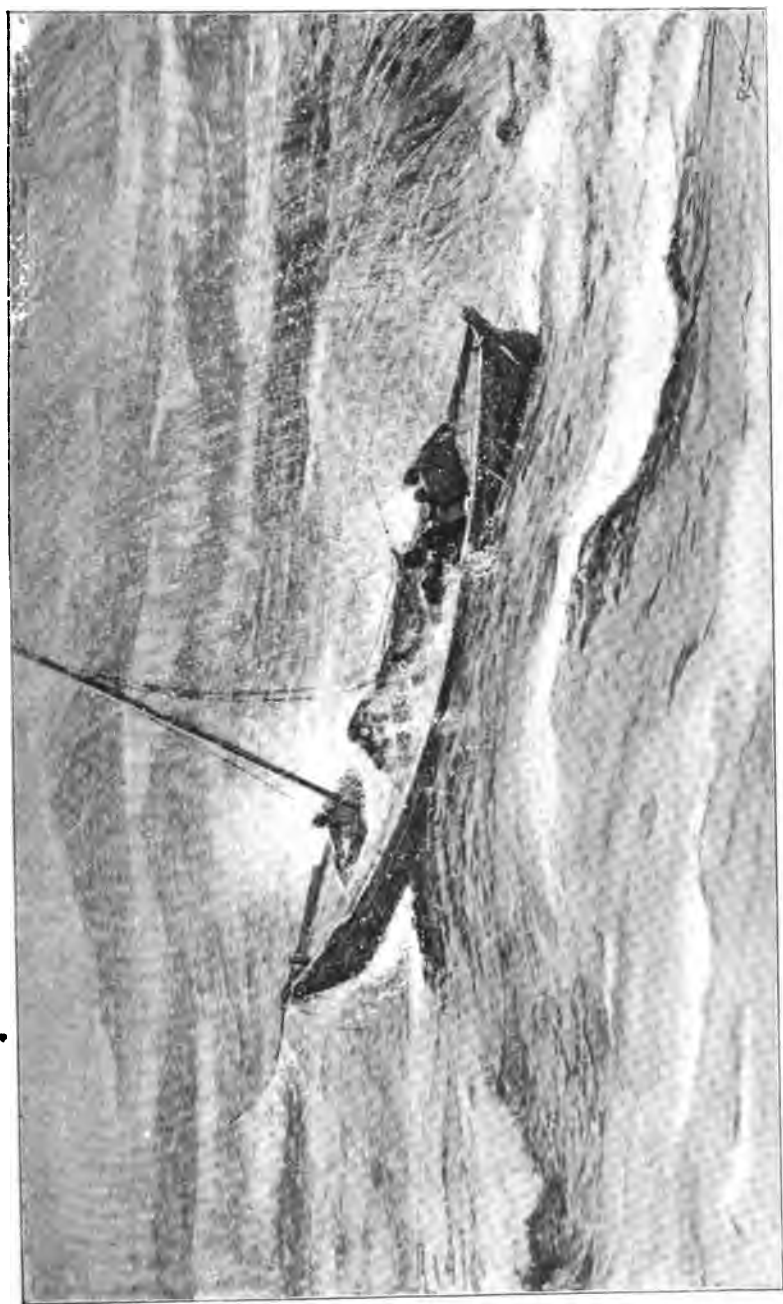
A THOUSAND DAYS IN THE ARCTIC

At 4.30 P.M. we passed Cape Ludlow, which is merely an ice-covered and a glacier-faced promontory, with upper ridges of a rock showing through the ice. Landing was impossible here. A rough sketch was made of it, and after we had passed it some distance I took a photographic snap-shot of it. We had gone through much ice, and as we sailed on towards Cape Lofley it became much closer and our progress—owing to it and the wind freshening and the whole coast being glacier-faced, rendering landing impossible and offering no shelter—more and more risky. At 9 P.M. we rounded Cape Lofley and ran on to within five or six miles of the cape west of it (Cape Mary Harmsworth) which I had first definitely seen from the summit of Cape Neale. Beyond it lay a dense bank of mist. The wind had now increased to nearly a moderate gale, and the ice had become very close, but of a low level description of from four to five feet in thickness, and being in motion we had many very narrow escapes from it. We had taken in a reef in the lug-sail, and had now continually to put the boat's head up into the wind and to shake the sail to avoid gusts.

Cape Lofley is of the same character as Cape Ludlow, with just a little more rock showing above the ice, but is glacier-faced, and there was nowhere where it was possible to land, still less to haul a boat out.

Cape Mary Harmsworth appears to be very similar in these respects. Heavy ice lay to seaward and ahead of us, and had every appearance of a tight pack; the wind was increasing in force, with an ugly looking sky and a rapidly falling barometer. Things looked very threatening, and it would be extremely nasty to be caught in a gale in our cockle-shell, especially among the ice we were in, which, although not heavy enough to break the force of the sea, was quite sufficiently so to smash our boat to match-wood; the whole coast was faced by high overhanging glaciers, rendering landing impossible. I decided to try and get back to Cape Neale, which was apparently the nearest spot we could land upon, and to wait there until the storm passed over before proceeding.

The whole coast, reaching from the throat of Cambridge Bay to as far as we could see to the west, is one unbroken glacier-face with the tops of basaltic rocks jutting out of the ice, with very high country behind it (it appeared to rise to about two



"THERE WAS LITERALLY NOTHING FOR IT BUT TO TRY AND WEATHER IT OUT IN THE OPEN."

NEARLY LOST

two thousand feet). A more utterly desolate scene it is impossible to imagine. With the wind rapidly increasing, glacier-face to right of us, and ice and stormy sea to left of us, our position was becoming very uncomfortable. Nothing but one large glacier could be seen landward. Cape Mary Harmsworth appeared to be as equally ice-bound at the shore as Capes Lofley and Ludlow. We estimated that Cape Ludlow is distant from Cape Neale seventeen miles, Cape Lofley from Cape Ludlow thirteen miles, and Cape Mary Harmsworth from Cape Lofley fourteen miles.

After turning our boat's head round to try and reach safety at Cape Neale, we ran with the wind two points on our port quarter. We threaded our way among the ice, often narrowly escaping collisions, with the spray breaking over us, and frequently shipping seas over the weather gunwale. We were all of us drenched to the skin; and a snow-storm coming on rendered it difficult to see Cape Neale.

At 10.30 P.M. the wind increased to a fresh gale and occasionally to a strong gale in the gusts, and the now high sea caused the boat to make so much lee-way that weathering Cape Neale looked very improbable. Things had now begun to look very nasty. We could proceed under sail no longer, and there was literally nothing for it but to try and weather it out in the open. We made a deep-sea anchor with three oars, to which we lashed the ice-anchor, and with about twenty fathoms of line attached to it from the bows brought the boat's head round to the sea. The sea rapidly increased and huge breakers threatened to swallow us up at every moment. They rose like mountains above our heads, and each one seemed about to engulf us. Snow and sleet continued throughout the night, and we could not see the land at all. It was bitterly cold and we were very tired and hungry, but the boat required such constant attention in bailing out seas and other work, and there were such difficulties in the way of getting food, that taking any was out of the question.

Thus we rode out the night, expecting every moment to go down. The cold was trying, we were wet to the skin, hunger was beginning to be felt, but we had not time to think of anything but bailing out our craft and keeping her head up to the sea. Every one was more or less cheerful, although one or two looked very much concerned, but I saw no fear in any one's face, and all obeyed orders promptly and without offering suggestions

A THOUSAND DAYS IN THE ARCTIC

or advice, which on such occasions, especially when promptitude of decision is essential to safety, would be particularly troublesome.

The barometer fell from 29.75 at 6 P.M. to 29.65 at 9 P.M., and to 29.60 at 10 P.M. (At 10 A.M. it had stood at 29.85.)

Note.—August 13th. On comparing the aneroid we find it registers six-tenths too high, making 29.60 equal to 29.00.

July 29th, Monday.—Matters have not improved in the least. It still blows as hard as ever, and a tremendous sea is running with often very nasty cross-seas, which render it impossible to properly head them. We are, however, still afloat, and the *Mary Harmsworth* is fighting a tough battle for us; shipping a great deal of water frequently, but by incessant bailing we get her clear again. Three or four times we have been rolled nearly over by short breakers and half filled with water, but she still keeps up. At about 4 P.M. a lump of jagged ice got foul of our sea-anchor and cut it adrift! This was a serious matter, for our boat was even less under control than before, and everything depends on our breasting the waves. Of course it is quite impossible to recover it again, and we have no means to rig another. The one we lost was a little too light, and the first of the usual three breakers in succession often washed it home on us, leaving the line slack. I put Blomkvist in the bows with an oar out to keep the boat's head straight, and Armitage rigged the jib aft of the mast to steady her and to give her stern-way to lessen the force of her meeting the waves, although it increased our drifting. Armitage and I relieved each other in directing the boat's course. The doctor, Fisher, Blomkvist, and Child bailed her out, and in turns did duty at the bow oar.

During the whole of this our second day we only got one or two glimpses of the land through the snow and sleet, which appears to be growing more and more distant, but what part of the land it is we cannot distinguish. We all in turns try to get a little sleep, but it is out of the question with the seas continually breaking over us! We are in a rather uncomfortable plight, wet through and through, famishing from want of food which we are unable to get at, and chilled to the bone; although, strange to say, when especially on duty in directing the boat's course I experienced the very greatest difficulty in keeping my-

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self awake, and once or twice nearly dropped off in spite of my teeth. Everything we possessed is drenched, and we ourselves are nearly exhausted with hunger, cold, and want of sleep. We also worked hard all the time. In this manner we spent another night, the gale still howling around us with unabated fury. Barometer at about noon read 29.40 (corrected to standard at Cape Flora 28.80).

CHAPTER XV

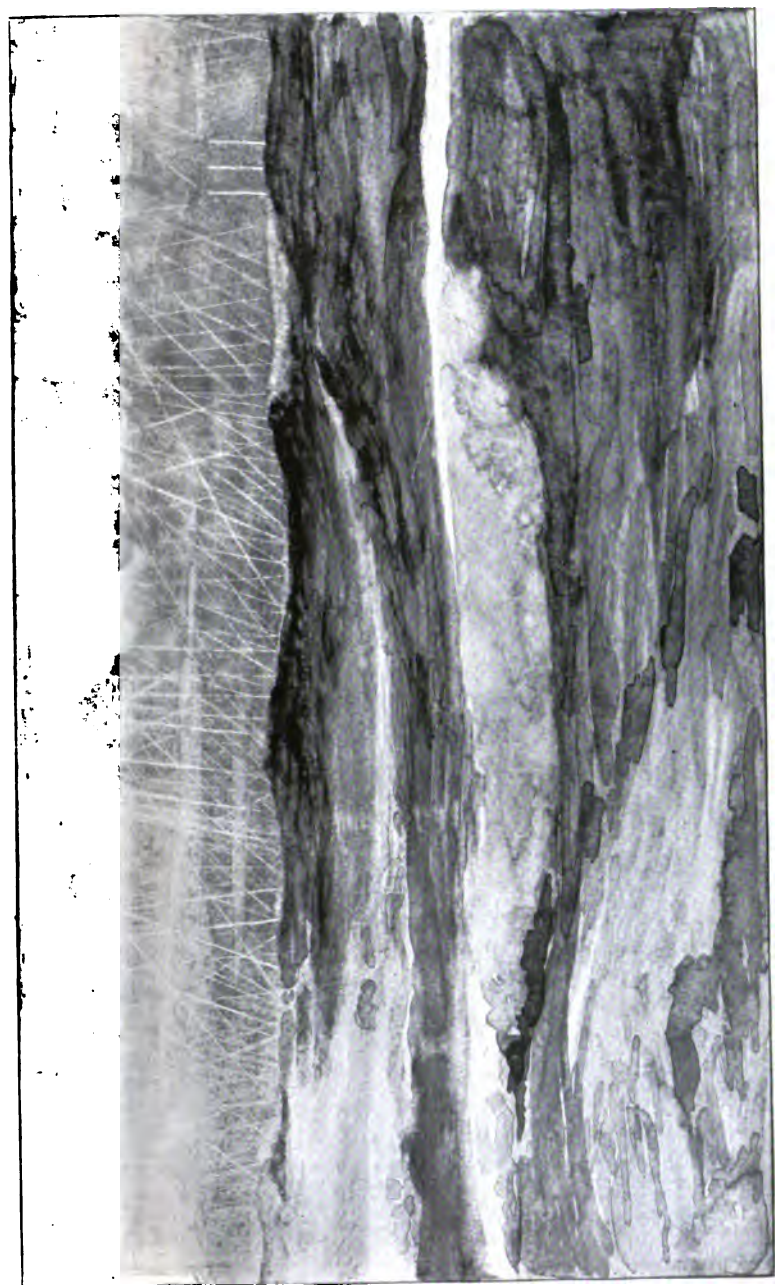
A SPECTRAL SKY AND PHANTOM SHIP

July 30th, Tuesday.—The gale blowing as hard as ever, but now from the north and northwest, with constant snow-storms; and the swell and cross-seas very high, the latter being often very tumultuous, constantly nearly swamping us with volumes of water. How the boat kept on the surface is a wonder.

Several times during the day I noticed a very remarkable appearance in the sky as the wind brought up the snow-storms. It appeared as if laths of wood were irregularly distributed over the sky, even to the zenith, wherever the nimbus clouds of the snow-storm covered it. On the northern horizon appeared three poles exactly resembling the three bare masts of a ship with the hull hidden by the high waves. These masts were white and at equal distances from each other—quite suggesting a phantom ship. The laths, also white, appeared straight, and the edges ran parallel to each other. They all were of a uniform breadth, non-luminous, and entirely suggested inch laths. There was no sun visible.*

The boat had now become very heavy and deficient in buoyancy, owing to everything we had on board being drenched with water, and as she rolled she lopped over water first on the starboard and then on the port side. To remedy this as much as possible and to give her more freeboard, we threw overboard several articles which could best be spared and were heavy, and so lightened her considerably. It was absolutely necessary, and we sacrificed all we could part with. The tiller had given way, and Child made another from a harpoon staff. Our position was very precarious, and although no one said anything, every man

* I have never been able to obtain an explanation of this phenomenon, neither can I in any way offer one.



"IT APPEARED AS IF LATHS OF WOOD WERE IRREGULARLY DISTRIBUTED OVER THE SKY."

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A SPECTRAL SKY AND PHANTOM SHIP

felt that the chance of life was exceedingly small, and that in all human probability we were bound for the bottom. One or two afterwards remarked that they thought the cairn and record on Cape Neale would be the last news any one would hear of us.

At 4 P.M. there came a lull in the gale, which was now from the west-southwest, and the horizon partially cleared, showing the nearest land very dimly, which we concluded to be Cape Grant ; but it was too far away (about forty miles) for us to be at all sure, bearing about north-northeast (true) of us. Seeing a chance of getting out of it, we set the reefed lug and jib, and determined to try and run down to it, although the wind was still very strong, blowing from a moderate gale to a strong breeze.

After about six hours' sailing, fairly racing through the water at fully five to six knots an hour, so that collisions with ice were a serious danger, necessitating my keeping a man in the bows as lookout, we reached the land, which on nearer approach proved to be Cape Grant ; and we ran round to the northeast side, hoping to find it sufficiently protected by the headland to enable us to land without damaging our boat or drowning ourselves. She, however, got nearly swamped, and loose ice came thumping in upon her with the sea and stove a plank in as we ran for the narrow beach. Owing to their weakened condition, Armitage, the doctor, and Child all got duckings in getting ashore ; but this, I think, made little difference, as we were all as wet as we could be already. We at last got everything out of the boat, and hauled her up on the very narrow beach. We were all of us more or less weak, and we had considerable trouble in doing this. Blomkvist and I were the strongest of the party, but we didn't feel any the better for our late little entertainment. Two or three were very groggy, and could hardly walk. We had had no sleep and nothing to eat but a biscuit or two each since leaving Cape Neale three days ago, except Child and I, who had a raw dovekie each, it being the only thing in the way of food reachable. The others I could not induce to share this rough-and-ready raw repast, but all replied, "I will have a little presently." Before the lull in the gale occurred we were speculating upon the probability of having to make for Novaya Zemlia if it continued to drive us to the southeast, and reckoned up our provisions. We have had an exceedingly near squeak for it, and it was very nearly ta-ta on many occasions. All are mightily glad to be on firm ground again.

A THOUSAND DAYS IN THE ARCTIC

On landing we each had a nip of the little that remained of our port-wine, and I proposed "The health of the *Mary Harmsworth* and the lady whose name she bears," and coupled Armitage's name with it. His nautical knowledge and experience was of considerable service to us. All my fellows have behaved extremely well, and if we had gone to the bottom would have done so as becomes men. We found all our spare clothes soaked and all our property dripping with water. The get-up of some of our party after attempting to change was most ludicrous. One appeared without breeches but with a very damp blanket wrapped kiltwise around his lower person. Another presented himself in a complete suit of oil-skins over very moist underclothes; a third in a long oil-skin coat—what he had on underneath is a secret known only to himself. A fourth without boots but in a pair of cloth moccasins, and in my leather coat. I had to dispense with underclothes, as they were saturated, and wore a pair of very damp breeches, which seemed to be somewhat drier, next to my skin. All my clothes were more or less soaked. Still, a jollier party never collected in a camp, but then were we not heartily glad to be so far safe after our battle with the gale? Our appearance caused great amusement and endless jokes. We all huddled together on the floor of our little tent, and slept soundly until midday next day in spite of our wet clothes and the cold, as it was snowing most of the time, and the thermometer hovered about freezing-point; this with the damp air and high wind made it a bit chilly, especially so to people in our circumstances. However, we had the satisfaction of knowing that we had made a successful journey and, but for the gale blowing us off the coast, would possibly have been even more so if we could have got through the ice around Cape Mary Harmsworth. I hope yet to have another try if the weather will allow us and the boat is not too much damaged.

The cape to the west of Cape Lofley I have named after Mrs. Alfred Harmsworth, "Cape Mary Harmsworth."

The bay between Cape Mary Harmsworth and Cape Lofley after Baron Nordenskjöld, "Nordenskjöld Bay."

The bay between Capes Lofley and Ludlow after Carl Weyprecht, "Weyprecht Bay."

The glacier reaching from the west side of Cambridge Bay to Cape Mary Harmsworth after Julius von Payer, "Payer Glacier,"

A SPECTRAL SKY AND PHANTOM SHIP

who, together with Weyprecht, were the brave discoverers of Franz-Josef Land.

The bold, prominent rocky headland at the head of Cambridge Bay after Dr. Fridtjof Nansen, "Cape Fridtjof Nansen."

The glacier north of Capes Stephen, Grant, Crowther, and Neale after Lieutenant Robert E. Peary, U. S. N., the well-known American explorer, "Peary Glacier."

July 31st, Wednesday.—The gale is blowing very hard again, and it is evident that we had seized the lull in the storm to run in in the nick of time. We turned out about noon, and spent the rest of the day in spreading out our clothes and trying to dry them, but the moist atmosphere and frequent snow-storms and sleet render this very difficult. We would give something for a fire just to be dry and warm for a change. The swell has much increased, and is breaking heavily and thumping heavy ice upon the beach. We had to shift our tents this afternoon, as the sea once or twice washed into them. Cape Grant on this side is a very bad place for a camp, as there is very little space upon which it is possible to put up a tent, as the sharp, jagged, steep talus runs down to the water's edge. The poor old doctor looks very thin and haggard; another day or two of it, I think, would have finished him. We in our tent (Blomkvist, Armitage, and I) are now all right again—only a bit stiff; but both the other two look hollow-eyed and played out, and small wonder. I have been engaged in writing up my journal of the last three days.

August 1st, Thursday.—We are still storm-bound. We spent the day in drying our clothes, etc., so far as the weather will allow us. The barometer shows indications of an improvement.

All the ice has now cleared out of the bays between here and Cape Stephen, and many largish bergs are drifting about between here and there, gradually passing south out of Nightingale Sound. Much ice is also coming down the channel.

August 2d, Friday.—There is less wind to-day, but a heavy swell is still running. The beach is much encumbered with ice blocks, and at present it is quite impossible to launch the boat, as it would be smashed at once.

Armitage and I walked down, or rather clambered down, to the depot of provisions on the southeast front of the cape, and added various provisions which we can spare if we find it impos-

A THOUSAND DAYS IN THE ARCTIC

sible to attempt to round Cape Mary Harmsworth this season. I find on a closer examination that our boat is much damaged, but I hope that we may fix her up well enough to try it. The provisions may come in for some unfortunate castaways or for ourselves some time or other.

The depot now contains in a sack:

Ham, 18 lbs.	Rump Steak, 8 lbs.
Mutton, 14 lbs.	Sausage, 4 lbs.
Beef, 14 lbs.	Cocoa, 1½ lbs.
Butter, 4 lbs.	Pressed beef, 4 lbs.
Milk, 2 lbs.	Tea, 1 lb.
Soup, 12 tins.	Sardines, 6 tins.
Beef-tea, 6 tins.	Flour, 60 lbs.

Above this depot, which is carefully covered with heavy stones, I left a jack upon a seven-foot bamboo staff.

August 3d, Saturday.—A heavy swell is still coming in upon the beach, and the wind is blowing very fresh from the east-northeast. We are getting a little more comfortable, as some of our clothes are now dry, this being the fourth day we have been employed in getting the water out of them. My guns, too, are much occupying my attention, as I fear the salt water will much damage them, and I am very particular about keeping them absolutely clean and free of rust. I have no belief in a sportsman who neglects his guns. The weather is cold and quite overcast.

August 4th, Sunday.—The swell now shows signs of going down, and the wind has dropped almost entirely, but, owing to the heavy swell that is pounding huge rounded masses of ice upon the shore, we cannot launch the boat until it dies down. I am getting rather tired of staying here. I set Blomkvist to calk and repair the boat, which is very leaky, being much strained during the gale, and has a plank stove in and three ribs broken.

The weather has much improved, and the sun has appeared to-day. About midnight Armitage and I climbed the talus and shot sixteen looms for the pot.

CHAPTER XVI

THE STORM SUBSIDES

August 5, 1895, Monday.—The swell having quite subsided and the weather looking better, I decided to make a move to the Cooke Rocks between here and Cape Stephen to get a change of scene. After cutting a road through the stranded ice-blocks on the shore, we launched the boat at 7.30 P.M., and started to row along the glacier-face, keeping out of harm's way from falling ice, towards these rocks. A large quantity of ice has come down Nightingale Sound, and is hanging off the bay and towards Cape Stephen, and numerous bergs are drifting with it. The sun has now come out, and large fragments of ice are constantly breaking off the glacier-face with a noise like thunder, causing a swell, which reaches for a long distance from where they fall into the sea. I saw to-day a large berg split into two, and the two portions topple over and collapse in the sea, causing a swell to reach for a mile from where it happened. It was a very fine sight, and one incredible to the uninitiated, as the berg a moment before looked quite the embodiment of solidity; a second or two later it had practically disappeared.

When nearly across the small bay we saw the ice rapidly coming in upon us from the east with the westerly running tide. We rowed as hard as we knew how, to avoid being caught between it and the high glacier-face, and after a stiff struggle reached the rocks, about six miles from Cape Grant and four from Cape Stephen, about 11.30 P.M. A bay about four miles deep runs up between the Cooke Rocks and Cape Stephen, entirely bound by glacier-face, and away back from the shore, about a mile or a mile and a half, a few small black rocks jut out of the ice, indicating probably the original limits of the bay beyond which the glacier has extended. This is a very bad spot for hauling a boat out, there being very little shore, and the rocks

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run out into the water. In doing this, weakened as she was by the gale and the landing upon Cape Grant, she now got very badly stove in and two ribs entirely gave way. She is a very old boat, and many of her timbers are quite rotten and soaked with water. She is an enormous weight and fearfully heavy to pull.

We temporarily patched her up as well as we could, and after a great deal of trouble launched her again, and quickly jumped



AFTER THE GALE—CAPE GRANT

into her as soon as she was in the water and rowed for all we were worth, as we thought she would sink, to a narrow strip of sand where at low water there was just room to turn her over and enable us more thoroughly to repair her. This we managed to do without mishap. Upon a raised beach (fifty feet above the present sea-level) we found a pine-tree of considerable age, twenty feet long, which had recently been turned over—by a bear we found on a closer examination. Below and under this raised beach we found an exposure of sandstone *in situ* containing plant-

THE STORM SUBSIDES

remains. Above the raised beach is the talus, running down from the basaltic cliffs (500 feet high by aneroid). There is a fine example of columnar basalt on the northeast front of the cliffs. I took photographs of the sandstone exposure and the cliffs.

We took a P.M. observation for longitude before leaving Cape Grant. I held a council as to again attempting to round Cape Mary Harmsworth, but came to the conclusion that it is now impracticable under the circumstances. There is every sign, too, of the short summer, if such one can call the season that passes for summer here, coming to an end. The sea, too, is getting filled with ice, much having come in from the east.

August 6th, Tuesday.—We erected a cairn of stones on the site of our camp, and in a tin, attached to the flag-staff with a union-jack upon it, we left the following letter :

“THE JACKSON-HARMSWORTH POLAR EXPEDITION,

“August 6, 1896.

“Six members of the Jackson-Harmsworth Polar Expedition landed here on August 6, 1895, in their boat, the *Mary Harmsworth*, having succeeded in exploring the northwest coast to a cape west of Cape Lofley. When west of Cape Lofley we met with much ice and encountered a gale of wind from N.N.E. We weathered it out in the open from the 28th to 9.30 P.M. of the 30th of July (with a sea-anchor, etc., but which got cut adrift by ice on the second day), when during a lull in the gale we ran into Cape Grant, distant then from us about forty miles, where we were storm-bound for six days. We intend now to proceed to Cape Flora, calling at Cape Stephen and Bell Island.

“Our boat is much damaged and leaks badly, but we are repairing her.

“We have carefully mapped the whole coast, and laid down various positions by astronomical observations taken ashore.

“FREDERICK G. JACKSON,

“Commanding the Expedition.”

On the envelope I wrote :

“Please forward a copy of this to Mr. Harmsworth, and replace this letter in the tin.”

The doctor found a vein of lignite about three hundred feet above the sea, and *in situ*, composed of pressed vegetable matter. It burns freely, and, but for the distance from Cape Flora, would be useful as fuel. I found a similar lignite to the north of Cape Richthofen in 1895. Also fossiliferous sandstone under the

A THOUSAND DAYS IN THE ARCTIC

basaltic cliffs, and a quantity of very fine bituminous shale, which burnt fiercely. Plant-remains were very distinguishable in the sandstone. Fisher found some specimens of *potentilla* here.

These rocks were unnamed by Leigh Smith, and the bay on the northeast side is likewise neglected. I sent Fisher and the doctor to the top of the glacier to make sketches of the rocks and bay and to take a few bearings with my prismatic compass. The rest of us spent most of the day in repairing the boat.

We made a fire of the large pine-tree we found on the raised beach and further dried our still damp clothes. That drift-wood was a perfect God-send ! We took a P.M. observation for a longitude. I counted seventy-three bergs in the sea off here. Some are a good size and of all shapes.

On the raised beach, fifty feet above sea-level, Fisher found about a dozen plants of *potentilla* on a dry, sandy soil, close to the crumbling edge. There are nineteen species of plants here, but *potentilla* and *sagina* are the only notable ones.

August 7th, Wednesday.—Armitage took a meridian observation for latitude to-day.

To the staff of the flag on the cairn I tied an empty .450 Henry Express cartridge-case plugged with a bullet containing the following note :

“THE JACKSON-HARMSWORTH POLAR EXPEDITION,

“August 7, 1896.

“A letter is concealed within a tin tied to the foot of this flag-staff under the stones. Please make a copy of it, which forward to Mr. Harmsworth, and replace the original.

“FREDERICK G. JACKSON,

“Commanding the Expedition.”

Having finished repairing the boat at 10 P.M., we packed up and set out across the bay for Cape Stephen, where we arrived at midnight. We had a moderate breeze from E.N.E. the greater part of the way, but after getting under the land it died down, and we had to take in the sails and row as usual. Wind has not favored us on this journey.

We landed on the southwest side of the point in a sandy cove, and found an excellent spot for a camp near the beach. After having some food we walked round towards Baxter Bay, Fisher and Dr. Koettlitz going with us to do some botanizing and geologizing. Fisher tells me it is a very good spot for his department,

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as all specimens that he has obtained elsewhere are present here. There is a good-sized bay running in about four miles between here and the last camping-place, surrounded by glacier-face, with the tops of rocks jutting out of the ice like nunataks at some distance back from the glacier-face, showing the original dimensions of the bay. The country behind is high and entirely ice-covered, and is wild and desolate looking in the extreme.

Cape Stephen has a large exposure of rock. There is at least one old raised beach one hundred feet above the present sea-level, and a talus from the rocks averaging five hundred feet.

Looms, rotches, dovebies, mollymokes, and glaucous gulls have young in their nests on the cliffs.

Blomkvist obtained three of the latter from a nest this evening, to replace those drowned during the gale off Cape Lofley.

On the southeastern side there are more plant species than on any other cape, the only absentee being *pleuropogon*. The western side of the cape is extremely barren. There is a corrie on this side from which run numerous rills over a flat beach bare of vegetation. The summit of the cape is a plateau, free from snow on its southern half. A starved lichen and moss here and there represent the plant life there.

On the east side of the cape is a thaw-water pool 120 yards long by 60 yards wide, and at its southern end is a spongy, mossy depression, such a spot as, Fisher tells me, *criophorum* might be looked for, but was absent. *Cyperacæ* are also absent. Even *juncus biglumis* and *luzula congesta* prefer the higher bank above. *Potentilla* is much more luxuriant than elsewhere in this part of Franz-Josef Land.

August 8th, Thursday.—We took P.M. observations for longitude, and then Fisher, Armitage, and I ascended Cape Stephen on the southwest side, and after a hard and rough climb reached the summit, upon the highest point of which we erected a cairn, and left a record in a tin among the stones at the top of it. The altitude, by sextant observation, of Cape Stephen is 792 feet.

The flat, stony summit was partially clear of snow, but the temperature was hovering about freezing-point, and the snow had a frozen crust upon it. A strong wind was blowing, rendering it decidedly cool in spite of the sun. I saw a fox on the plateau, but it was too wary to let me get within shot of it. I

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took bearings of all the important landmarks within sight, and made sketches of the various coast-lines.

On returning to camp I ascended the talus and shot twenty-seven looms for our larder.

Dr. Koettlitz found a portion of an old reindeer horn, half buried in mud twenty-five feet above the present sea-level, showing that reindeer once lived upon these islands, but with the advance of the ice-sheet now covering them have died out. Mr. Leigh Smith found an old horn upon Cape Flora in 1881, and we also found another on the same cape. The doctor has also found the head and skeleton of a bull walrus about the same height above the sea here.

The weather has been very pleasant to-day—clear and sunny, with a cold westerly breeze. We erected a cairn on the southwest point of the cape, at the foot of the talus, on a raised beach about seventy yards from the shore, over which I placed a union-jack on a bamboo staff, and within a tin, concealed among the stones, the following letter and the cards of the crew of the *Mary Harmsworth*:

“ THE JACKSON-HARMSWORTH POLAR EXPEDITION,

“ August 8, 1895.

“ Six members of the above expedition landed here at 11 P.M. on August 7, 1896, in their boat the *Mary Harmsworth*, having returned from exploring the west coast to a cape twelve miles to the west of Cape Lofley. A strong gale overtook us at that point, and we lay-to, attached to a sea-anchor, from July 28th till the evening of July 30th, when a lull in the storm enabled us to make Cape Grant, then forty miles to the northeast of us, which we reached at 9.30 P.M. Here we were storm-bound for six days.

“ To-day we ascended Cape Stephen, upon the highest point of the summit of which we have erected a cairn, leaving a record in a tin among the stones at the top.

“ We intend to proceed to Bell Island *en route* for Cape Flora to-morrow.

“ FREDERICK G. JACKSON.

“ Commanding the Expedition.

“ We have erected cairns, upon which we have placed union-jacks, and records within tins, on all the capes between here and Lofley (Lofley and Ludlow excepted, as upon them landing is impossible owing to their being surrounded by a glacier-face).

“ Please send a copy of this record to Mr. Harmsworth, replacing the original.”

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To the flag-staff above the stones of the cairn I tied an empty .450 Henry Express cartridge-case, containing the following :

" THE JACKSON-HARMSWORTH POLAR EXPEDITION,

" August 8, 1895.

" A letter contained within a tin is concealed among the stones at the top of this cairn at the foot of the flag-staff.

" FREDERICK G. JACKSON,

" Commanding the Expedition."

There are a few pieces of drift-wood (chiefly pine) on Cape Stephen of considerable age. Some are far above the present sea-level. No particular aspect of the cape appears to be favored more than another.

The doctor found here a bed of hard calcareous sandstone under the raised beach near sea-level. This bed is *in situ*, and contains plant-remains, in which the stems and leaves can be plainly seen. The doctor also obtained a piece of black lignite up the talus at an altitude of about three hundred feet above the sea, composed of plant-remains. On the surface is noticeable a fan-shaped leaf, possibly *ginkgo*. Both he and Fisher have been most energetic in making examinations, collecting for their respective departments, and so far as possible the various specimens have been labelled on the spot.

August 9th, Friday.—Took a meridian altitude of sun for latitude, and a P.M. observation for longitude to mean with yesterday's. We then struck camp and loaded up the boat. While so engaged large quantities of ice began to come down Nightingale Sound, driving fast with the tide and current. We took some food, and waited for it to drift clear. The ice opening a little, we at last started for Bell Island at 8.30 P.M., having an exciting race with the moving ice ; and after some hard rowing managed to get clear of it without mishap. We then set the sails for an hour or two, but the boat drifting away very much to leeward, we were afraid of being driven out to sea again. To avoid this we lowered the sails and set to work to pull against a considerable swell coming in from the northeast, which took all the "way" out of her, and made rowing very hard work indeed. The weather was very thick, rendering any land indistinguishable the greater part of the time.

At 4.15 A.M. we reached the end of the long spit upon which

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Leigh Smith's hut stands on Bell Island, but had to row all round it and up Eira Harbor, which was now clear of all but detached cakes of ice from five yards to fifty yards in diameter, to find a place suitable for landing.

Landing near the hut was out of the question, owing to the shore all round being bordered by a glacier-face from six to ten feet in height, and the ice extending back to from fifty to one hundred yards from it. This had evidently not been here in Mr. Smith's time.

August 10th, Saturday.—After having some dinner, Armitage and I walked up to Leigh Smith's hut. After a careful search we found two tins nailed upon the wall. (These tins had not especially attracted our attention on our previous visit, as we supposed that they had been so fixed to hold lights.) One contained a record of the wreck of the *Eira*, and was deposited in September, 1881; and a second tin contained a letter addressed to Richard Neale, M.D., and a second record written by Mr. Leigh Smith. (I had been told that the letters were deposited in a small cask; therefore we did not expect to find them in tins. The only keg in the hut we opened on the previous visit, but found nothing in it at all.)

I copied the first record (that of 1881), and replaced it in exactly the same condition and spot as I found it. It ran as follows :

"The *Eira* got nipped by the ice on the 21st of August, 1881, about a mile east of Cape Flora, and went down before many things could be saved. All hands got safely to the south side of Cape Flora and built a house, as the ice was too much packed to allow them to go to Eira Harbor.

"We intend to pass the winter at Cape Flora, and in the next summer try to get down to Novaya Zemlia in the boats.

"If we are not able to get away we must wait where we are for the chance of a vessel coming to our relief.

"Cape Flora is about ten miles east of the house in Eira Harbor.

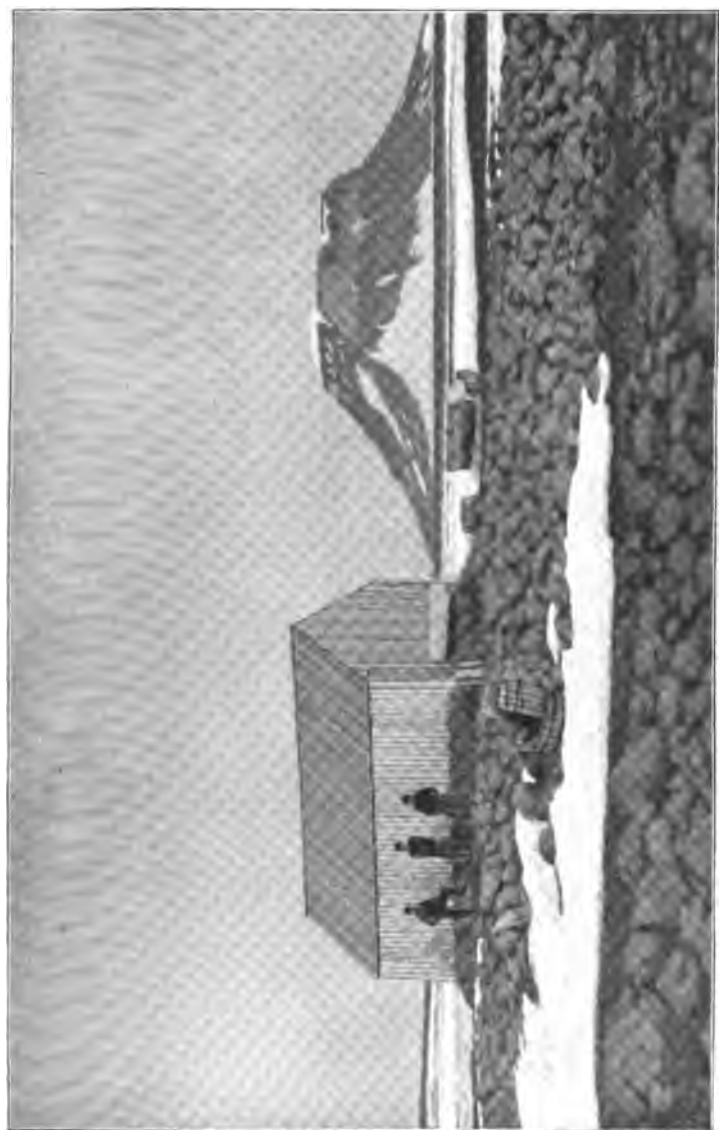
(Signed)

"B. LEIGH SMITH.

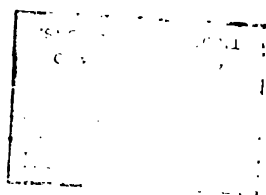
"August 31, 1881.

"P.S.—We are very short of provisions, and cannot hold out for more than a year, even with the help of walrus, bears, and birds."

It was wrapped in medical oiled silk within pieces of paper, and the whole enclosed in a small mustard-tin and tied up with a piece of string.



BELL ISLAND AND EIRA HOUSE



THE STORM SUBSIDES

The second tin, containing a record dated June 14, 1882, by Leigh Smith and Dr. Neale's letter, I carried away to send to the writers by the ship next summer.

We camped on the beach about one-third of the way up Eira Harbor, which was the nearest spot to the hut upon which we could pull our boat out. The rest of the shore of the spit was ice-faced. The western entrance of the harbor would make a good winter harbor for a ship, but I would not take her far in or she might not get free in the summer, or at all events not until very late.

I shot two red-throated divers on a pond of thaw-water about half a mile to the east of the camp. I got them to the bank by embarking in one of the end sections of the canvas boat. We are repairing the small dingy, which is lying by the hut, and intend to take her to Cape Flora to send back to England. She has a timber split from stem to stern, and leaks like a sieve. A bear has clawed a large hole in the larger boat near the beach, and in addition it is frozen down and full of ice.

I took bearings of all the prominent points of the country to be seen from here, and made sketches for my maps.

The flag-staff on the top of the hut had been much gnawed by bears, showing how deep the snow must have laid to enable them to walk on to it. There is still a quantity around unmelted, and an extensive flat of deep snow about seventy yards to the southeast of the hut. It is difficult to account for this, except by the extreme depth of the drifts, as it gets the sun all the twenty-four hours, and it is only a few feet above sea-level. Here there is a wide stretch of raised beach unsuitable for vegetation, excepting certain low forms in the numerous pools of thaw-water. Stunted and starved plants of fifteen species continue to maintain an existence wherever there is sufficient soil.

Copy of second record by Leigh Smith :

"CAPE FLORA, TEN MILES E. OF EIRA HARBOR,

"June 14, 1882.

"We all got through the winter very well and not uncomfortably. No scurvy and no serious illness. We killed and have eaten thirty-four bears and twenty-four walrus, and about two thousand five hundred looms.

"The boats are all ready to start for the south.

A THOUSAND DAYS IN THE ARCTIC

"The ice broke up yesterday, but we have to get some walrus, bears, and looms to make up a sufficient stock of provisions.

"We must go where the open water takes us, but shall try for Nova Zembla in preference to Spitzbergen.

"We had no very cold weather until after Christmas.

"There was plenty of water in October, and navigation seemed to be possible up to Christmas. Bay ice formed all the winter, but it constantly broke up again, and it was not until the 3d of March that it froze into a solid mass and formed a land floe six or seven miles wide.

"Walrus, male bears, and foxes were about all the winter.

"There has been a large water to the south ever since the beginning of May and so far as we can see to the west.

"Birds began to come back in February.

	MAX.	MIN.	MEAN	HIGHEST	LOWEST
1881					
October . . .	14.8	+3.1	+8.95	47	-11
November . .	+4.3	-6.86	-1.25	29	-22
December . .	+15.13	-5.55	+4.79	31	-24
1882					
January . . .	-21.5	-29.9	-25.7	-4	-43
February . .	-20.4	-33.1	-26.7	+25	-43
March . . .	+4.74	-7.5	-1.4	+24	-43
April . . .	+5.7	-8.33	-1.25	+23	-18
May . . .	+28.25	+15.15	+21.8	+36	0

"-43 was the lowest temperature that any of our thermometers would show. We had much stormy weather, wind mostly easterly until the 20th of May. Since the 22d of May it has been blowing from the northwest, and yesterday we had a whole gale."

The above record was unsigned, but in Mr. Leigh Smith's handwriting.

The altitude of the rock of Bell Island is nine hundred and thirty-eight feet, and the rocks on Mabel Island seven hundred and forty-seven feet, both by sextant observation.

August 11th, Sunday.—About 1 A.M. Armitage, Fisher, and I pulled over to Mabel Island to explore it. It is a far more suitable spot for a house than that upon which the hut stands on Bell Island. There is about a mile of a level raised beach stretching from the cliffs to the sea, and several large ponds of water (one about five feet deep in places) fed by the snow melting in summer. There is also a fair amount of vegetation, and it is well

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protected from northerly winds on the southeast side of the cliffs.

I found a very old walrus skeleton three-quarters of a mile from the present sea-beach, and I shot a cock diver (red-throated) and a young one on one of the ponds. No other diver was to be seen, so the cock was apparently left to act as nursery-maid. It is a good spot botanically. I could see no signs of the oars said to have been placed on the glacier by the *Eira* party in 1881. Facing south, with high rocks to moderate the northerly winds, there is here a suitable beach for an improved flora. In three hours Fisher found more forms than on the other capes we have landed upon and examined, including the most rare and beautiful little grass, *Pleuropogon Sabini*, Br., originally discovered on Melville Island by Sir Edward Sabine, and afterwards on the other islands in that region, but not in Grinnell Land, Greenland, or Spitzbergen.

Pleuropogon is the only genus peculiar to the Arctic regions.

There are other plants of some interest here—viz., *Luzula campestris*, var. *congesta* Lej., *F. glabra* (typical *L. congesta* is found in Greenland and Grinnell Land, but not in Melville Island or in Spitzbergen).

This was found on Cape Stephen and on Cape Neale also.

Saxifraga stellaris, *L. v. vivipara* is here, but although the soil is apparently as suitable as that of Cape Gertrude and Cape Stephen it is very stunted. This plant is very rare in Greenland, where it has been seen between 70° and 75° north latitude on the east coast by Sabine. On the west coast it was found by Brown at Jacobshavn and at Egedesminde by Nares's Expedition (Hart), and Taylor found it on the Kickerline Islands in Cumberland Gulf. In Spitzbergen it is not rare. All the above localities are in much lower latitudes than the Franz-Joseph Land positions.

We got back to camp about 5 A.M. and had dinner (that of August 10th) and turned in.

We had breakfast at 2 P.M., and I then walked up to the Eira House (this name is printed in large letters over the door in pencil) and had everything securely fastened up. I hung the key of the inner door up on a nail inside the porch and tightly secured the porch door.

I left in the house 14 lbs. of beef, 2 lbs. of pressed beef, 4 lbs. of

A THOUSAND DAYS IN THE ARCTIC

coffee, 2 gallons of spirit, and 2 lbs. of sausage, in case of emergency on some future occasion.

At 8.30 P.M., having loaded up, we started to pull through Eira Harbor for Cape Flora, as the sea is becoming daily more ice-encumbered than I quite like, and seems to be increasing.

As there was only a light easterly breeze we could not sail. We found a reef stretching right across the southern entrance



THE MARY HARMSWORTH AND CREW

and reaching from the point of a spit on Mabel Island to a short spit on Bell Island. In the centre, however, we found a channel with about four feet of water, through which the tide was running fast south. It was low water.

We met with a good deal of ice off the entrance to Gunter Sound, and on nearing Cape Flora we had a good deal of trouble with it as the tide was running rapidly west, moving it along very fast, and our boat being old, much damaged, and leaking badly, and with two boats in tow, would not stand one touch with it. She also was fearfully heavy, making rowing against

THE STORM SUBSIDES

the tide very tough work. She had too much in her for us to pull her out on the ice without unloading, which takes time, and as a rule, when it is necessary to pull a boat out on to the ice to avoid being crushed by it, it has to be done at a moment's notice and smartly.

When off Cape Flora we rowed hard for the nearest point of the land to avoid being cut off by ice, and managed to reach it to the west of the point near the glacier. Here we had to wait for an hour to allow the pack, which was grinding along the land, to open and the tide to slacken. I landed and walked to the top of the ridge to see the condition of the ice in the bay, and finding it was there more stationary, being out of the tideway, I returned and succeeded in piloting the boat round. We landed near Eira Cottage at 7.30 A.M. (of August 12th). The weather has been very foggy all night.

CHAPTER XVII

BACK AT THE HUT

August 12, 1895, Monday.—We found that the ice off Cape Gertrude and the bay between Cape Flora and there had broken up, only a little remaining, but the sea to the east and south was full of drifting ice, and the water space between here and Bell Island is now much ice-encumbered. All the ice-foot at Flagstaff Point has disappeared, leaving the rocks bare, showing a striking difference in the appearance here between this year and last. I am told by Heyward that the gale at the end of July washed it away. To judge by this season I am not at all sure that August, as has hitherto been assumed, is a better month for reaching Franz-Josef Land than the end of June or during July. August was a bad month last year, and the sea is rapidly becoming now as ice-blocked as it was then, although during June and July the sea was comparatively ice-free, and on June 21, 1882, Leigh Smith found open water reaching eighty miles south of Cape Flora.

During the end of July the fjords north discharge large quantities of ice into the sea to the south of Franz-Josef Land, and probably the Kara Sea, too, breaks up towards the end of July, pouring out masses of ice west along the southern shore. During May, June, and July there was a great preponderance of winds from north to northeast and from north to W.S.W. which tend to blow the ice off the land and to clear the western portion of the Barents Sea.* During the first four days of August sixty hours wind was recorded, averaging a force of nearly four (Beaufort's notation) from southeast and E.S.E. which have a contrary effect (Table), were registered at Cape Flora, perhaps accounting for the sea becoming ice-blocked.

* See table in Appendix.

BACK AT THE HUT

We got up to the hut at 8 A.M. and cooked some "dinner." It took us eleven and a half hours' hard rowing to come from Bell Island, and as we had only had some cheese and a little grilled oatmeal (we had been out of biscuits and some other things for some days), which we had unsuccessfully tried to make into cakes but the result was a mass resembling very dirty sawdust, we were quite ready for "dinner." We then turned in at 10 A.M. and had breakfast at 5 P.M.

Everything has apparently been going on well during our absence, and Heyward, the Governor of Northbrook Island, has acquitted himself very satisfactorily. His Excellency looks, however, very much out of repair about the seat of his trousers, and as if he and soap and water were not on speaking terms. He has done very well, though.

After breakfast we carried up the remainder of our gear from the beach, and straightened things up generally.

We have had a rather risky and adventurous journey, but a successful one from every point of view.

I should, however, have liked to have rounded Cape Mary Harmsworth and have seen where the coast goes to round the corner. Next summer, in the *Windward*, I hope to do this, at least, however. Still, this one will be, I think, a recorded journey among Arctic boating expeditions. We have reached the farthest northwest limit yet attained here, and have had the good luck to be able to go considerably farther even than Mr. Leigh Smith was able to do in a steamer in two years.

We have mapped the whole coast and have discovered fresh coast-lines both to the west of Cape Lofley and in Cambridge Bay.

We have landed upon and explored all the headlands between Cape Flora and our limit, which no one has landed upon before, and have taken astronomical observations for latitude and longitude upon them.

We have taken meteorological observations throughout the journey, and have made valuable collections of all kinds. I fear that our boat will never be able to go on a similar trip again, for besides being very old, with very rotten timbers in many places, she had such a mauling during the gale and since that she is in a very bad condition and leaks like a sieve, and owing to her old condition I fear cannot be repaired effectively. She does

A THOUSAND DAYS IN THE ARCTIC

not sail well close to the wind and makes an awful amount of leeway.

The boating season here is certainly over now. The whalers have now got back to the winter quarter, E.N.E. and east instead of the summer northwest. The days have got very cold, the weather generally unsettled; and the sea is now very much ice-encumbered. R

With a steamer or even a large wooden launch we could have done much more, and a lot of good work might be done by wintering with a steamer, or having a launch of such dimensions as would stand bad weather with comparative safety. It is, however, a dangerous coast for any kind of craft, but especially for a small open boat like ours only with sail. Id.

There is a great deficiency of anything approaching a harbor, and the whole country is glacier-bound, preventing any possibility of landing except at long intervals, where rocky capes project out through the ice-cap, and even there it is often very difficult to find a suitable bit of beach to land upon. A steamer with greater speed might, however, run for shelter to such places as Gray and Cambridge Bays, or, if there is not too much ice, weather out a gale in the open with comparative safety, whereas in the case of an open boat it is more than even betting that it goes to the bottom. H

We had a wonderful escape at the end of July, and I think it is possible for the expedition to have a closer shave.

We find on comparing the aneroid we had with us with a standard mercurial barometer at the hut that it registers tenths too high, making an increase of three-tenths since we were on July 11th. This had something to do with letting us off at the little entertainment we had at the end of the month off Lofley, as we had confidence in a high glass such as we had, being unaware that it showed nearly half an inch more than it did a fortnight before.

We have been away a month and four days. We met contrary winds and calms both on our outward journey and returning, and for every mile we sailed we certainly paid four.

The following are the weights of the crew of the *Mary Hall* taken before starting and on our return:

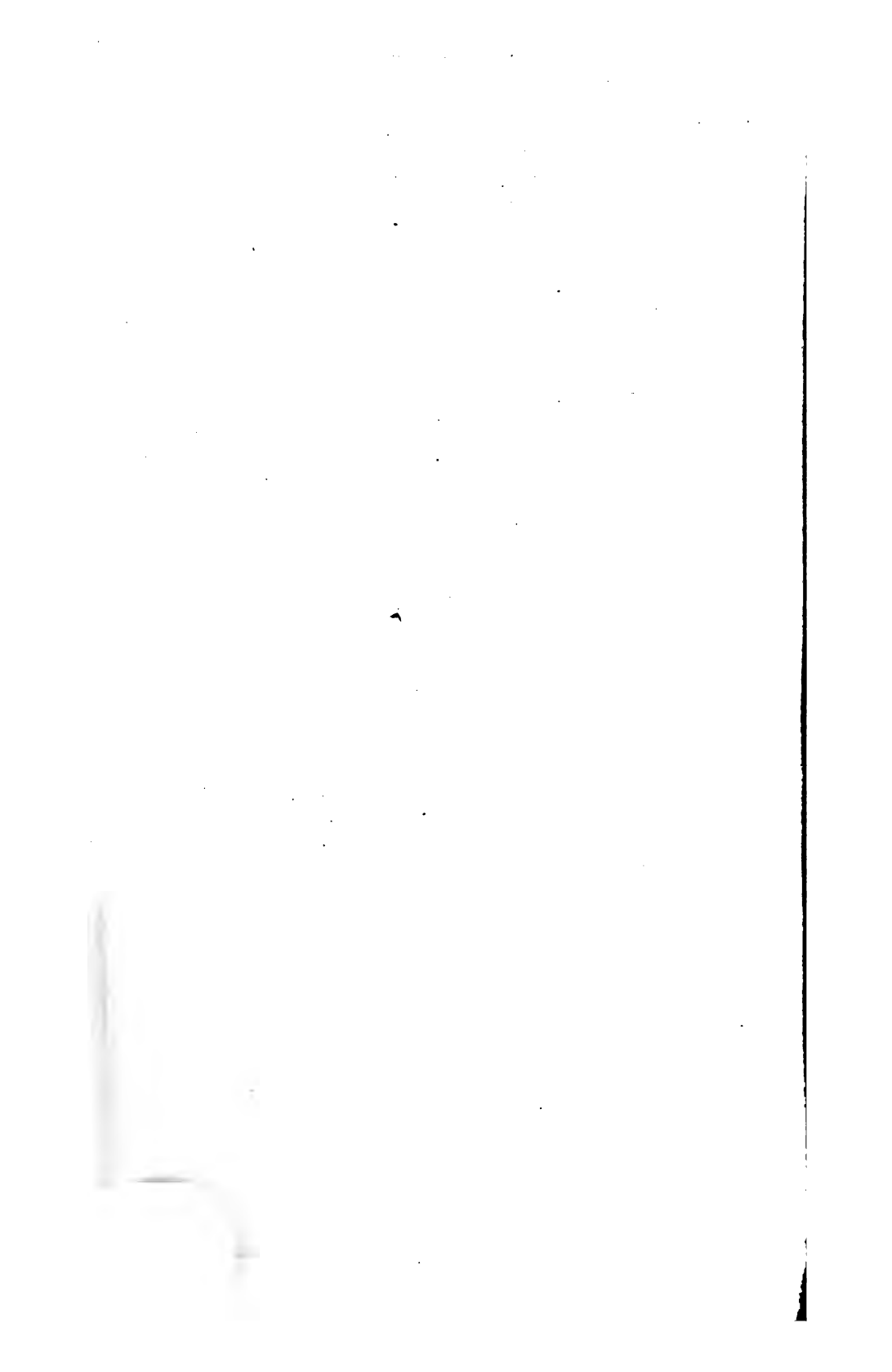
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BACK AT THE HUT

	July 10th	August 12th
Armitage. . . .	182 lbs. (=13 st.)	174 lbs. (=12 st. 6 lbs.)
Fisher	159 lbs. (=11 st. 5 lbs.)	163 lbs. (=11 st. 9 lbs.)
Dr. Koettlitz . .	176½ lbs. (=12 st. 8½ lbs.)	176½ lbs. (=12 st. 8½ lbs.)
Child	171 lbs. (=12 st. 3 lbs.)	155 lbs. (=11 st. 1 lb.)
Blomkvist . . .	207 lbs. (=14 st. 11 lbs.)	202 lbs. (=14 st. 6 lbs.)
F. G. Jackson . .	193½ lbs. (=13 st. 11½ lbs.)	188 lbs. (=13 st. 6 lbs.)

Child is the only one of us who has lost considerably (16 lbs.). He had apparently failed to pick up as fast as the others after our splash off Cape Lofley.

Armitage and Blomkvist pull good strong oars. All are good fellows.

On looking at the maps on our return I find we must have been within a few miles of the mysterious Gillis Land, if it exists at all by right in these latitudes, and Cape Mary Harmsworth is possibly upon it. Nordenskjöld evidently considers that Petermann had no right to place it where it is now marked on the charts. Its position has evidently been altered on some maps to fit in with the supposed direction of the coast-line of Leigh Smith's discoveries.

The grass Fisher found upon Mabel Island (*Pleuropogon Sabini*), which is found nowhere in the world except on the Parry Islands, and sparingly on one or two others of the Arctic North American Islands and on the east coast of Novaya Zemlia, is a most interesting discovery, and may throw light upon the vexed question of the distribution of plants.

Geology, according to Etheridge, points to a chain of islands stretching over the pole from Franz-Josef Land towards the Parry Islands. Is this evidence in support of it? Hardly with a deep sea to the north.

CHAPTER XVIII

THE GUN IN FRANZ-JOSEF LAND AND GAME LIST

HAVING returned safely from a journey that nearly ended fatally for us, I may here pause and give some account of the sport of Franz-Josef Land. It was serious sport for us at times, as our larder and our welfare depended upon our fresh meat supply, which I look upon as a valuable ally to keep at bay that scourge of the Arctic, scurvy. Without fresh meat we should have had to fall back upon tinned, with the great risk of taking ptomaines into our systems and so contracting scurvy. I never tolerate the waste of game anywhere where I have any control over the matter, and in Franz-Josef Land I never allowed life to be taken for the sake of sport alone.

The larger animal life in Franz-Josef Land is not great so far as species is concerned. We shot during our first twelve months there over sixty bears; in the second year twenty-five, and the last year only twelve (two when sledging), showing that we had greatly reduced their numbers. And I think that, even in a country so rich in animal life as Franz-Josef Land is, it would be a question of only a few years to kill out all the larger game there.

Walruses we found to be fairly plentiful, but not in the numbers that they once existed in Spitzbergen and elsewhere, and I more than doubt if it would pay steam whalers to visit Franz-Josef Land to take them. It most certainly would not for more than two years in succession.

Of saddle-back seals we saw exceedingly few; likewise also the ground seal. The ringed seal or floe-rat of the whalers was the most plentiful, and upon these bears chiefly depend there for existence. Of course they have no mercantile value, owing to their small size and the difficulty in taking them in numbers. Of the right-whale, *Balæna mysticetus*, we saw no example

THE GUN IN FRANZ-JOSEF LAND

throughout our stay in the north, although they have undoubtedly existed in the sea to the south of Franz-Josef Land, for old bones were found by us, some above the altitude of fifty feet above present sea-level; which, allowing for the rising of the land or the retreat of the sea at the rate of one foot in a hundred years, would give the age of those bones as at least five thousand years.

The probable reason for the absence of the *mysticetus* to the south of Franz-Josef Land is that its principal food—the “rice-food,” as the Scotch whalers call it—is not present in these waters. The sea, too, is a very shallow one.

Narwhals were seen on two or three occasions only in small numbers, and two shoals of white whales twice.

We never saw any finners, bottle-noses, or any other species of whale besides those I have mentioned. Reindeer, although they once lived upon Franz-Josef Land, have now ceased to exist there. By the advance of the ice-sheet the few survivors were doubtless driven as their last refuge to such spots as Cape Flora and Cape Stephen, where the high rocks keep back the ice and the scanty grasses and lichens in front of the rocks kept life in them until bears, disease, or starvation ended their days. On both of these capes we discovered old reindeer horns, and Mr. Leigh Smith found an old antler upon Cape Flora on his second voyage in the *Eira*.

We found a few blue foxes, but very few, and these were so very wary that none were shot, although one young one was captured alive upon Cape Grant, and kept in a pen for a few days. I tried all manner of devices in the shape of traps, snares, and even spring-guns to secure them, but without success.

Of bird life to replenish our larder, looms were our great standby. These useful sea-birds were found nesting upon most of the capes along the south coast, and afforded us a pleasant change from the rather tough, flavorless bear-meat. The rotche, or little auk, also exist in considerable numbers, and there are besides a few “dovekies.”

A few Brent geese were shot and three eider-ducks. The former, although occasionally seen in some numbers, owing to their wariness were not easily bagged, and it was indeed a feast-day when we had one for dinner.

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Besides these birds there were kittiwakes, glaucous gulls, fulmar petrels, ivory-gulls, snowy owls, and Richardson's skuas, which could have been included under the heading of game had necessity required it, but our friends, the loom and the bear, always protected them from it.

It was, however, to bears we chiefly looked to stock our larder, and an occasional bear-hunt gave us some diversion. I always allowed two or three dogs which showed some aptitude for bear-hunting to run loose during the winter, and had one dog, "Nimrod," tied to a rough kennel outside the hut. These dogs would get on the track of a bear on the floe and set up a barking; "Nimrod" would take up the chorus, and thus let us know what was going on.

One of my men and I would then set off in chase with our rifles, and guided by the cry of the dogs stumble through the mist and darkness over the floes. After proceeding a mile or so, gradually the noise would become more and more distinct, and some dark objects jumping around a large yellow one, from which proceed loud hisses and snarls, would appear in sight.

A halt is then called to enable us to recover our wind after the rough-and-tumble pursuit.

The bear in the meantime has been engaged in making rushes at the dogs, one of which, with his tail tucked between his legs and looking as if he had seen things he would gladly forget, runs up to where we are standing.

We then separate and advance from opposite points until within about ten yards of our game, my rule being to approach the animal until the outlines of his head could be distinctly made out. He appears to be a little undecided as to whether to charge us or to beat a retreat; but a dog, taking advantage of his indecision and encouraged by our presence, makes insolent remarks almost in his ear, and the bear dashes round to retaliate. At the same moment two shots ring out, and poor Mr. Bear rolls over dead, with at least one bullet in his brain. One of us then returns to the hut to bring out a sledge party to haul him in. We drag him into a canvas hut reserved for bear skinning during the darkness, and remove his skin and blubber, and cut up the carcass into convenient joints. The dense atmosphere caused by the rising steam in the intensely cold air suggests a laundry in full swing.

THE GUN IN FRANZ-JOSEF LAND

Shooting walruses with the modern hard-hitting rifles is a comparatively simple matter. The two rules necessary to be followed are: (1) Shoot them in the head, and (2) take precautions to prevent them sinking on being struck dead, as nine times out of ten they will do so. The best plan, if feasible, is to harpoon them first, and to follow this up with a bullet in the head.

It was a common sight in Franz-Josef Land to see an ice-piece covered with what looked in the distance like a number of



"NIMROD" ON BEAR GUARD

black leeches, which on nearer approach proved to be walruses lying sleeping and idly drifting with the tide or current.

The Lee-Metford rifle, with the nickel-covered government bullet, I found particularly effective with walruses, one bullet only being necessary to knock the head all to pieces. On one occasion a walrus charged us when upon a small ice-piece, and the only portion of his head which presented itself to me as a target was the nose and tusks with its mass of hard, heavy bone lying in front of the brain. One shot, however, from my Lee-Metford between the tusks with the nickel-covered bullet killed the animal dead.

For bears I always used a soft-nosed bullet.

Walruses in the water, especially bulls, are apt to be dangerous

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antagonists, being pugnacious, and seem to have a natural love of fighting. Esquimaux and walrus hunters have the greatest respect for them. I have known a cow walrus with a calf "go for" a boat, and with its strong tusks rip open the bottom, rendering it necessary to hurriedly haul it out upon the ice to prevent its sinking and drowning the occupants. Their attacks, too, are frequently quite unprovoked. On the ice, however, they are harmless if there be space for an active man to move around. A large bull walrus weighs as much as two thousand pounds; the cows are, however, much smaller.

The general impression that the Lee-Metford bullet passes through bone without fracture I found to be quite fallacious; but, on the contrary, it quite pulverizes bones struck by it, and only on one occasion did I find it drill a hole through bones without very extensive fracture, and that was in the case of the right lamina of the atlas of a walrus. With our doctor's kind help we traced the course and noted the injuries inflicted by over two hundred bullets, and we could always tell at once by the condition of a bone wound if it was caused by a bullet from a Lee-Metford or by a Henry rifle by the far greater injuries caused by the former.

In experimenting with the regulation government rifle and cordite ammunition, I discovered the interesting fact that oats have a great stopping effect upon bullets fired by it, by slewing the bullet broadside-on after entering a sack of oats a very short distance. My shots were fired at the short range of thirty yards.

I found that in the case of flesh wounds the entirely nickel-covered bullet gives insufficient shock, and consequently is defective in stopping power. Such bullets as the "Tweedie" or the many varieties of the soft-nosed ones "mushroom" sufficiently to overcome this.

Harpoon-guns are useful in taking walruses, especially the light shoulder gun with a small harpoon and strong, fine line, such as are used for killing porpoises. I recommend, however, a breech-loading instead of a muzzle-loading action, and the usual steel split-ring shackle on the harpoon requires replacing with a twisted copper wire one.

A hand-harpoon or two of the Norwegian pattern should also always be carried with detachable staves.

THE GUN IN FRANZ-JOSEF LAND

A strong boat, a few flensing-knives, a steel, a tomahawk, and spare line, to which, of course, must be added the Lee-Metford rifle and nickel-covered bullets, and the equipment for taking walruses is complete.

For taking seals a rifle and seal-club are the only things required; but a hunting-sail mounted on a miniature sledge, similar to that used by the Esquimaux, is useful for stalking them on the ice. This is easily made with a piece of pure white cotton or linen and two or three pieces of wood.

For all the various species of Arctic birds, No. 2, No. 5, and No. 8 shot will be found useful.

Loom shooting gives excellent practice for driven feathered game.

Behind the hut on Cape Flora rise high basaltic cliffs to a height of 1300 feet, with a steep talus of 600 feet of broken-down debris from the rocks with a sparse covering of grasses, mosses, lichens, and other Arctic plants.

To the rocks as April closes the looms return to sun themselves, and later on to lay their eggs and rear their young.

It was my practice when shooting for the pot to ascend the talus about two-thirds of the way, and wait with my gun for birds flying round or coming in from the sea. I abstained from going up to the top during the nesting season in order to avoid killing hen birds, the cocks being more generally on the wing.

In the autumn, when it was necessary to kill a large number within a short time, I climbed to the summit under the rocks. Looms are very fast flyers and strong on the wing, and when coming down in front of a breeze one has to be very quick with the gun or they are out of shot in a second. Excellent sport it is, and on a fine sunny day most enjoyable, with a panoramic bird's-eye view of the point of Cape Flora, the ice-covered sea, with its bergs and fantastic hummocks spread out at one's feet; and away to the westward Cape Grant rises from the sea, with the white glaciers beyond Bell Island, Cape Stephen, and Mabel Island shining in the sunlight.

One rapidly becomes expert with these birds. On one occasion, being challenged by a comrade, I took a hundred in succession, and succeeded in bagging ninety-two of them. Of the remainder six fell wounded into the sea, which we had agreed to count as out of bounds; two, I think, I missed. They fly straight,

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although very fast, and consequently are not hard to hit. They will, however, sometimes carry away a lot of shot.

We quite satisfied ourselves that bear's liver may be very injurious, producing violent headache from five to six hours after taking it.

I had a quantity of the liver that had affected us bottled up in spirit, and on my return to England submitted it to Professor Vaughan Harley for examination, to whom I am much indebted for the following report :

" Watery and alcoholic extracts of liver had no action on mice when subcutaneously injected.

" Two mice subcutaneously inoculated with 1 C.C. each of etherial extract died three days after ; but it is difficult to say if not accidental.

" A dog and guinea-pig given some watery extract had no ill results.

" The quantity, being so small, had to be economized ; and what is left is now being examined for any ptomaine or other reaction."

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894 Aug. 17	Golden Plover	Lat. 70° 30' N. 50° 30' E.L.	30 yards	Was shot by Jackson flying round the ship. Preserved the skin.
" 29	He-bear	To south of Franz-Josef Land	60 yards	One shot behind left shoulder, one in forearm. Ran forty yards and fell on the floe. By Jackson.
" 30	She-bear She-cub	To south of Franz-Josef Land	50 yards	Shot in the water from the ship. The mother had two shots—one in neck and one in base of skull. By Jackson and Armitage.
Sept. 8	Walrus	Cape Barents	50 yards	One shot in neck. At once sank. Sporting .303 rifle. By Jackson.
" 9	He-bear	Cape Barents	70 yards	One shot in neck (base). Ran thirty yards and fell. Bullet entered to inner side of left shoulder, below the outer third of clavicle, causing severe wound of pectoral muscles, wounded subclavian vein, fractured 2d rib on left side, and entered the apex of left lung, which it passed through.

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894				Through the posterior mediastinum, severing the descending aorta. Penetrated the lower lobe of right lung, and shattered the posterior part of 9th rib on the right side. The leaden portion of the bullet was found in the muscles of the back, and the nickel portion loose in the thoracic cavity, which was full of blood. Killed by Jackson.
Sept. 9	She-walrus	Cape Barents	40 yards	One shot through base of skull. .303 sporting rifle. By Jackson.
" 9	Walrus	C. Barents	30 yards	Sank at once. By Armitage.
" 11	She-walrus	C. Flora	4 yards	By Armitage. One shot base of skull with .303 government rifle. Sank at once, but rose in 18 hours, and was recovered.
" 19	He-bear	C. Flora	45 yards	Shot by Armitage from ship with Martini-Henry. Had grass in the stomach.

Several ringed seals were shot from the ship during August and September, but all sank almost immediately.

Oct. 1	Bear	On floe C. Flora	50 yards	First shot in chest, followed by six others in the rump, at from 150 to 250 yards range. After a chase over the floe of four miles, it finally laid down and died, but owing to the darkness the carcass had to be left till morning, but during the night the wind cleared the ice out. By Armitage and Jackson.
" 4	Bear	C. Flora	10 yards	On the side of a berg near ship. .450 Express rifle. One shot through neck. Two shots in right shoulder by Armitage with .303 government rifle. Escaped by taking to the water. Jackson's shot in the neck went clean through from left to right. It did not appear to affect him.
" 5	3-grown He-bear	C. Flora	50 yards	One shot high up behind left shoulder from .450 Henry Express. One shot with Martini-

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894				
Oct. 7	He-bear	C. Flora	5 yards	<p>Henry, lower down, behind the right shoulder. Ran thirty yards and rolled over. By Jackson, Armitage, and Burgess.</p> <p>One shot .303 sporting rifle. The bullet took the following direction: The bear must have been holding its nose elevated. The wound of entrance was a little below and to the back of the left ear. It travelled in a forward, inward, and upward direction through the soft parts. Shattered the angle of the lower jaw. Proceeding in the same direction, it shattered the basilar process of the occipital bone and the ethmoid, and entered the brain, where it lodged. This bear had threatened the carpenter, who had gone out for a walk. I shot it on the floe, 350 yards from the ship. Measurements: 8 ft. 1 in. from tip of tail down belly to tip of nose; 7 ft. 9 in. from tip of tail down back to tip of nose; girth, 7 ft. A very large he-bear. I walked up to within five yards of him before firing, to insure getting in the shot satisfactorily. He floundered around for a minute or two after falling, and Jackson again shot him in the neck to prevent his damaging the dogs, who were snapping at his legs after being bowled over.</p>
Oct. 14	She-bear	C. Flora	17 yards	<p>She had started to lay up in a hole in a snow-drift, but was disturbed by the dogs. Had only been there two days. Uncertain if in-cub. One shot from .303 sporting rifle. Leaden-nosed bullet. Bullet entered below and behind left ear, taking an upward, inward, and forward course, shattering petrous portion of the temporal bone and the whole of the base of the skull,</p>

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894.				<p>sending the line of fracture through the vault of the cranium, separating the occipital bone from the rest of the skull, with small portions of the parietal bones attached; also otherwise fracturing parietal bones. The left angle of the lower jaw was fractured and also the right, but there the fracture was more anterior than that of the left, extending through the body of the bone. The leaden portion of the bullet was found among the shattered fragments of the bone about the base of the skull. There was great injury of the brain tissue, and extensive hemorrhage externally from left ear, the wound, and the nose. There was nothing at all in the stomach. She was a young but full-grown bear. Shot by F. G. Jackson.</p>
Oct. 22	He-walrus	Floe, C. Flora	7 yards	<p>Killed by two shots from .303, by F. G. Jackson. One penetrated crown of skull. One fractured angle of left lower jaw and damaged the jugular vein and carotid artery. Found shells and pebbles only in the pyloric portion of stomach. 13 ft. long. Weight, about one ton and a half.</p>
" 26	She-walrus	Floe, C. Flora	5 yards	
" 30	4 She-walruses	Floe, C. Flora	5 to 20 yards.	<p>With .303 (one walrus head very much injured). The entrance into skull was near posterior and lower part of right parietal bone, the direction being downward and slightly forward. This caused several fractures to radiate into the temporal bone, and the force being continued downward and forward, it broke up the massive petrous portion of temporal bone into several pieces, opening up the middle ear and, still continuing in same direction, fractur-</p>

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894				ing into joint below jaw, the condylar process, being separated from jaw, right side of which it fractured again in two places. By Jackson and Armitage.
Oct. 30	She-walrus	Floe, C. Flora	5 yards	Secured and tied up to floe, but lost owing to the pressure of the ice. Shot by Armitage and Jackson.
" 31	He-bear	On floe, C. Flora	15 yards	
Nov. 9	She-bear	In water off floe, C. Flora	15 yards	Three-quarters grown. Not pregnant. .303 government rifle. Temp., 22° F. below zero. Shot by Armitage and Burgess.
" 10	He-bear	On floe	7 yards	Killed instantly. .303 sporting rifle. Shot by Jackson. <i>Description of injury and course of bullet:</i> Wound on left side of neck, about three inches behind ear. Passed obliquely backward through muscles of neck. Fractured the axis or second vertebra, in part shattering it into grains as small as sawdust and into numerous larger parts. It also fractured the articular process of third vertebra. The atlas was not uninjured, one of its large transverse processes being splintered. The bullet then continued its course, and was found embedded in the muscles in the right side of neck, about two and a half inches from spine. Pieces of the leaden part of the bullet were found among the fragments of the axis.
" 11	He-bear	On floe C. Flora	15 yards	Shot by moonlight; by Jackson; three shots .303. The first (1st) was fatal, but he managed to stagger 200 yards after it. <i>Description and course of the three bullets:</i> (2d) Wound of entrance on right side of thorax, penetrating cavity between third and fourth ribs, penetrating left lung, continued on its course obliquely forward and to the

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894				<p>left across the chest, fracturing first rib on the left side. The larger portion of the bullet was found close to the skin by a wound in the shoulder probably caused by a splinter of the lead travelling through. (1) Wound in left side of the neck. Passed obliquely through the soft parts to the right side. The leaden portion of the bullet probably escaped by wound of exit opposite and slightly behind the wound of entrance. Its course was close to the spine, but it left it uninjured. It, however, wounded the oesophagus and also one of the carotid arteries—which one, however, was not ascertained, but there was an enormous amount of hemorrhage from this wound. (3) Wound of entrance an inch anterior and two inches below left ear. The damage done was unascertainable on account of the frozen condition of the part. Temp., 30° F. below zero, and a fresh gale blowing.</p>
Nov. 13	He-bear	On floe	6 yards	<p>At 4.15 A.M. by moonlight. Bear charged at Jackson. Killed by one shot from .450 double Henry Express (by him). <i>Description of injury and course of bullet:</i> Wound four inches behind left ear. Bullet travelled obliquely backward and inward across neck, shattering transverse processes (left) of fifth and sixth cervical vertebræ. It was deflected slightly across spine in front of bodies of vertebræ, entering thorax on right side, and found in apex of right lung. The spinal marrow was uninjured, but there was considerable hemorrhage in the spinal canal, both within the meninges and between them and the bone. Bullet much mushroomed.</p>

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1894 Nov. 14	He-bear	On floe, C. Flora	15 yards	With .450 double Henry Express by moonlight. First bullet knocked him over, but he struggled up again. Second bullet finished him off. Jackson imitated a seal by lying on the ice and wriggling about, and the bear rushed up to him. <i>1st bullet</i> entered at base of neck on right side just above shoulder. Took a backward and outward direction through muscles until arriving at the spine of the scapula of the same side near the shoulder-joint, which it broke off. Passed through it without fracturing the body of the bone. It then passed on in the same direction, and was found in the blubber of the ribs behind the right shoulder. <i>2d bullet</i> entered on the right below the eighth rib, passed forward and inward, fracturing the eighth rib; passed through right lung and entered the right ventricle of the heart, and passed on through the left auricle into the left lung, where the bullet was found near the apex. A little undigested seal-skin was found in its stomach. Shot by Jackson.
Dec. 28	He-bear	On floe, C. Flora		Shot by Blomkvist with a Martini-Henry rifle. The bear had chased him and another. In good condition, but there was nothing in the stomach or intestines.
" 28	He-bear	On the floe	9 yards	With one shot with .303 sporting rifle. Soft-nosed bullet. Dark, no moon. At about 8.30 A.M. Bear rushed at Jackson on his approaching him. He was in good condition, but with nothing in the stomach or intestines except a little fluid in the former. <i>Course of bullet</i> : Entered one inch above right eye, fracturing frontal bone; and its course being backward and downward, it ploughed up

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1895				and shattered a large part of right parietal bone, sending also from that point numerous severe fractures into left parietal as well as frontal bones; and breaking up in its course into numerous pieces, great and small, the right temporal with its petrous bone and the occipital, the condyles of which were almost completely separated from the rest of that bone. The brain, of course, was very severely injured on that side. The bullet was found in pieces in the débris at the base of the skull (back part).
Jan. 9	He-bear	Floe at C. Flora	60 yards (3d shot)	Killed with three shots from .450 double Henry Express. First and second shots badly wounded him but did not stop him. The third shot knocked him over. Only some undigested brown paper was found in his stomach. He was in very good condition and fat. It was bright moonlight (close to "Bear Corner"). <i>Course of 3d shot:</i> Bullet entered left side opposite 3d rib at its angle (two inches from spine). It fractured the 3d rib, passed through the apex of the left lung in an inward, forward, and upward direction, travelled across the lower (or anterior) surface of 2d and 1st dorsal vertebræ, pulverizing those surfaces, and sending star-shaped fractures through their bodies, causing hemorrhage in the spinal canal for about six inches. Continuing in the same direction, it fractured the first rib on the right side close to its articulation with the first vertebra (but not separating that with the second vertebra from the rib). It then passed through the muscles of the neck and went out at the back of the right side of the neck.

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1895				
Jan. 18	He-bear	On floe, C. Flora, 2 miles from ship	12 yards	<p>A considerable quantity of blood (about three pints) was found in the cavity of the left chest. Shot by Jackson.</p> <p>Killed, after a long chase of two miles over the floe in the darkness, with one shot from double .450 Henry Express rifle. Temp., 31° F. below zero and a gale blowing.</p> <p><i>Course of bullet:</i> Bullet entered neck three or four inches behind and in line with right ear. It travelled in a backward and inward direction through the muscles of the neck till, arriving at the posterior portion of the fourth and fifth cervical vertebrae, it fractured that part of them, entering the spinal canal and severing the spinal cord, continued in the same direction and slightly downward through the muscles of the left side of base of neck. Severed the left subclavian artery, and passed in front of scapula into left axilla, and stopped close to the ribs at the back of that region. A little manilla rope-yarn was found in the stomach; otherwise it and the intestines were empty. Shot by Jackson.</p>
Jan. 20	He-bear	On floe, C. Flora	20 yards	<p>By Armitage. Shot with three shots from the .303 government rifle. Temp., 30° F. below zero. A very large bear, being 7 ft. 9 in. along the back.</p> <p><i>Course of fatal bullet:</i> Entered neck somewhat in front and above left shoulder. Proceeded in a backward direction until arriving at upper border of left scapula, the bullet passed through about an inch and a half from upper edge. This separated the whole of the upper part from the rest of the bone, the line of fracture running into the glenoid cavity of the shoulder joint, divid-</p>

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895				<p>ing the articular surface into two halves. It then proceeded backward still, but somewhat inward, through muscles of back, until arriving at spine. It passed between the spinous processes of fourth and fifth dorsal vertebræ, near which a portion of the nickel of the bullet was found. At this point the bullet changed its course, proceeding forward and downward through the muscles on the right side of the back and base of the neck, where, after extensively wounding the large vessels of right side of neck, it also considerably wounded the trachea, causing quantities of blood to descend into the lungs. The remnants of the bullet were found at this point buried in an enormous blood-clot, which filled the connective tissue spaces near by. Of the other two shots fired, one missed him altogether, and the other was only a skin wound, passing out again. Nothing was found in the stomach or intestines.</p>
Feb. 3	She-bear She-cub	Cape Gertrude	4 yards	<p>She was lying-up in a hole, being disturbed by the dogs at the air-hole to her lair. Had given birth to a she-cub a day or two previously. Shot with .303 sporting rifle, "Tweedie" bullet. <i>Course of bullet:</i> The bullet entered about two inches below and a little to the front of the right eye, and its course was backward and inward. After piercing the skin it passed through the temporo-maxillary fossa, with the muscles, etc., contained therein. It then passed through the sphenoid bone and brain. It pierced the occipital bone on left side of foramen, thence through the muscles of the neck, and passed out again about four inches behind the</p>

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895				<p>left ear. In the course of its passage it left no bone of the cranium intact, for the frontal, both temporals (with petrous portions), parietal, as well as the occipital, being fractured into many small pieces, as though a heavy mass had struck the vault, the skull being practically shattered. The exit wound was only a little larger than the entrance one (see Journal for Feb. 4th). Shot by Jackson.</p>
Feb. 11	He-bear	Close to hut	8 yards	<p>Killed by four shots from double .450 Henry Express rifle. Nothing in stomach (except two pieces of his own jaw-bone) or intestines. <i>1st bullet</i> entered about two inches below the left eye. It fractured considerably left side of lower jaw, driving several small fragments into the throat, two of which were found in the stomach. It passed backward and inward through root of tongue, fracturing hyoid bone. It carried away the left half of the epiglottis. It then travelled backward and downward into the larynx, and fractured the cricoid cartilage and several rings of cartilage of the trachea, making a jagged wound in it. It then ploughed through the muscles in front of the cervical vertebrae, and a piece of the bullet was found in the muscles opposite the fifth vertebra. <i>2d bullet</i> entered the left side of the abdomen, travelled forward, inward, and upward, ploughing its way through the muscles of side of abdomen and thorax until, meeting under surface of scapula, it penetrated it, making a star-shaped fracture, and was found in the blubber under the skin at the top of shoulder-blade—a distance of four feet from the</p>

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895				point of entrance. <i>3d bullet</i> entered over centre of right scapula, passed through it in a downward, forward, and inward direction, fracturing the bone extensively, and entered the thorax between the second and third ribs, wounding the apex of right lung, and passed out of thorax close to the left side of sternum, breaking a splinter off it, and was found embedded in the connective tissue between the muscles at base of neck on left side. <i>4th bullet:</i> Wound of entrance was situated at side of neck, about midway between head and shoulder, nearer upper (or back) part on right side, and travelled in a backward and downward direction. After passing through the muscles of the right side, it struck the spine at the fourth vertebra, fracturing the articular processes of it and the fifth vertebra, as well as the transverse process of the fourth, and passed for two inches up the spinal canal and obliquely across it, which was filled with blood-clot, and disorganized the nervous tissue within these vertebrae. It then passed out between the fifth and sixth vertebrae, breaking the left transverse process of the eighth, and penetrated the muscles on the left side of the neck. The bullet was found in the blubber under the skin, in the front of left shoulder at the base of the neck. Shot by Jackson.
Feb. 14	He-bear	On floe, C. Flora	20 yards	Killed by Armitage with three shots from the .303 government rifle. First shot wounded him in the neck; the second missed him. He then ran for a mile, and Armitage got up with him, and killed him with a bullet that cut the left carotid artery and the trachea,

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895				also the left axillary artery. Nothing was found in its stomach or intestines.
March 6	He-bear	On floe, C. Flora	73 and 100 yards	Killed by three shots from .303 sporting rifle, with "Tweedie" bullets. <i>1st bullet</i> entered the left flank, fracturing the fifteenth and sixteenth ribs, penetrating into the thoracic cavity, passed through diaphragm into abdominal cavity, above the left kidney. It wounded one of the middle lobes of the upper part of the liver, also the cardiac end of the stomach, and tearing one of the larger blood-vessels. The stomach was full of blood. The bullet then crossed below the spinal column, through the muscles attached to the bodies of the vertebrae, and again re-entered the thoracic cavity through the diaphragm, emerging from it between the fifteenth and sixteenth ribs, and the bullet was found close to the skin in the blubber of the right flank. <i>2d bullet</i> entered left side, fracturing eleventh and twelfth ribs. Passed inward and forward through the back of the lower lobes of both left and right lungs, which were extensively torn, and contained a quantity of extravasated blood (blood also poured from the mouth). It passed out of the thoracic cavity between the seventh and eighth ribs, the larger part of the bullet escaping by exit wound just behind right axilla. A piece of the nickel was found in the blubber close to the exit wound. The <i>3d bullet</i> entered three inches from the second, and evidently cut the inferior vena cava or some large abdominal vein, as the bleeding was very great. The bullet could not, however, be traced among the viscera. A small piece of rag or bunting,

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1895				semi-digested, was found in the stomach—otherwise the stomach and intestines were quite empty. A fibroid adenoma (lobulated), about the size of a walnut, was found between the lower lip and the gum, and protruded above the level of the teeth. He was in very good condition indeed. Was 7 ft. from nose to tail both along the belly and along the back. Photographed him. Shot by Jackson.
Mar. 18	Bear	Floe to S. of C. Flora (3 miles off)	60 yards	Chased for three miles over the ice to south of Cape Flora, and finally overtaken and shot when crossing a stream of open water in which the ice was moving west at two miles per hour. Armitage shot him in right shoulder at 100 yards range, and Jackson crept over some open cracks in the ice and got to within sixty yards of him, and killed him with a shot from his .303 rifle, with a "Tweedie" bullet, through the throat. The ice drove over him within a minute of his being killed, rendering it impossible to get him. Shot by Armitage and Jackson.
" 20	She-bear 2 cubs	Mabel Island	30 yards	On the ice-slope of Mabel Island. A small she-bear in very poor condition (evidently just having come out from lying-up), and two cubs about two months old. On coming up with her Jackson found her making vigorous rushes at "Sammie," the dog, and on his approaching within fifty yards of her made a determined charge at him. Jackson stopped her, however, when about thirty yards off with a shot from his .303 and a "Tweedie" bullet in the right side of the lower part of the neck, and after spinning round once or twice, she returned to her cubs. He fin-

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1895				ished her with two more shots and captured her cubs. She had only a little grass in her stomach, and had very little fat on her body. The temperature being -30° F., and being anxious to get on, the courses of the bullets were not traced.
Mar. 20	He-bear She-bear	Bell Island	80 to 50 yards	Shot high up (two-thirds of height) on the talus of the cliffs of Bell Island. Jackson shot the she-bear through the head first at eighty yards, and she rolled head over heels to the foot of the talus, a height of about 700 feet, and the he-bear started after her, when a shot from Jackson made him swing round, and he then made a rush in his direction, when he put a second bullet in his right shoulder, breaking it, and he then began rolling and partly scrambling down the talus. Jackson put another shot into him on his way down, and even when at the bottom he got on to his legs and faced round for some one "to go for," but a fourth shot through the heart finally laid him out. He was a huge, old bear over 8 ft. long. He exhibited great rage at these proceedings, and would have made it very unpleasant for any one he could have got at. He was rather thin. No open water near or within many miles. <i>Course of bullet (she-bear):</i> "Tweedie". .303 bullet entered just to the left of right eye in the line between the eyes. Broke a hole in frontal base and smashed the roof of the head, and left half of the occipital bone churning up the brain matter. The bullet lodged under the skin behind the left ear.
" 28	He-bear	Elmwood	12 yards	Shot with .303 sporting rifle and "Tweedie" bullets, on the snow-bank behind the but

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1895.				<p>when stalking our dogs, which were tied to spars close by. He was a moderate-sized young he-bear, and very bold. A quantity of grass only was found in his stomach. The liver was studded with milliary tubercles. He was in poor condition. <i>1st bullet</i> entered base of neck on the right side, passed backward, downward, and inward through upper or anterior part of right scapula, then entered thorax towards the middle line by fracturing fifth rib close to spine. Ripped up muscles on under part of bodies of vertebrae, and caused jagged wound of the descending aorta about six inches from the heart. Pieces of bullet were found embedded in the left lung and in the blood-clot lying in the thoracic cavity. <i>2d bullet</i> was fired by Armitage from .303 government rifle and "Tweedie" bullet, and shattered the humerus of left arm, and pieces of bullet were found in the axilla among the blood-clot there. It did not penetrate farther. <i>3d bullet</i> entered the left side, penetrating twelfth rib considerably. Passed inward, forward, and upward through lower lobe of left lung, then through posterior mediastinum and into upper lobe of right lung, causing considerable jagged wounds of their substance, and pieces of bullet were found in both lungs. He managed to struggle six or eight yards after the first shot, but as the extent of his injuries were not known, two more shots were fired. Shot by Jackson.</p> <p>All the birds had a large number of a small species of shrimp in their crops.</p>
April 4	4 doves	Water off C. Flora near ship		

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895 April 5	36 doves, 3 rotches, 1 loom	In lane of water near ship		All the birds had a large number of small a species of shrimp in their crops.
" 6	32 rotches, 12 doves- kies	Do.		Ditto. Ditto.
" 7	8 rotches, 3 doves- kies	Do.		Ditto. Ditto.
" 11	50 looms, 12 doves- kies 3 rotches	Do.		Ditto. Ditto. One rotche had the remains of its winter coat in a white line of feathers around the neck. (Kept the skin for specimen.)
" 13	37 looms	Do.		Shot at Cape Flora during ab- sence sledging by the doctor and others.
" 16	He-bear	C. Flora		Ditto. Ditto.
" 17	He-bear	At camp in De Bruyne Sound	35 yards	Approached our camp under the wind at 6.15 A.M. Jackson shot him through the fore- head with a solid .303 gov- ernment. The bullet passed through the head and the up- per part of the neck, and out again nine inches behind the head. He had followed up our tracks.
" 21	He-bear	Near Sharpe's Rock, C. Flora		Shot at Cape Flora during ab- sence sledging by the doctor and others.
" 21	She-bear, He-cub (captured)	On talus, C. Flora		Ditto. Ditto.
" 30	He-bear	Lat. 81° 4' 38" N.; long. 53° 46' 37" E.	30 yards	He came down our tracks at a trot, and made for us without the least hesitation, until a shot from Jackson with his .303 rifle hit him in the lower part of the neck, and he slewed round; so Jackson put a second bullet in behind the right shoulder, penetrating the right lung and the base of the heart. After this he ran

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1895				
May 2	She-bear He-cub (2 years old)	At camp. Lat. 81° 20' N.; long. 55° 54' 52" E.	70 yards	<p>twenty yards. He showed the utmost fearlessness and absence of caution, and would have made it very unpleasant had he been missed.</p> <p>They both came down towards the camp and approached without any fear or hesitation. Two shots from .303 killed the mother, and the cub made off, but returned after two hours to the body, when Jackson put a bullet ("Tweedie") through the right side of the head under the ear, which passed through and out on the left side under the left ear, and the nickel of the bullet lodged in the flesh of the left fore-leg.</p>
" 5	He-bear	At ship, C. Flora		Shot at Cape Flora during absence sledging by Dr. Koettlitz and others.
" 14	24 looms	Talus, C. Flora		<i>Contents of crops:</i> Shrimps.
" 17	12 looms	Do		Ditto. Ditto.
" 17	1 snow- bunting	C. Flora		<i>Contents of crop:</i> Quartz, basalt, poppy-seeds, scurvy-grass, saxifrage-seeds, and moss.
" 19	82 looms	Talus C. Flora		Large flocks of looms were returning from seaward, flying much lower than usual across the foot of the talus. The threatening weather evidently drove them in for shelter. They had nothing at all in their crops, so doubtless they had flown a long way and had not stopped to feed on the way.
" 20	3 buntings			<i>Contents of stomachs:</i> Quartz, leaves of grass, moss, oats without husks, hairs of oats, basalt, seed of saxifraga, and seed of papaver nudicaule. Jackson skinned these for specimens.
" 25	26 looms	Talus, C. Flora		
" 27	22 looms 2 rotches	Do (by Sharpe's Rock)		

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895 May 28	He saddle-back seal	300 yards from shore of Hooker Island		It was killed 300 yards from the shore of Hooker Island, near the old depot. Had a hole through the ice communicating with a tide crack. Nearest known open water or polynia, off Cape Barents (twenty miles distant). Nothing in the stomach but a few threadworms, and only three-quarters of an inch of blubber at most under the skin. The seal's hole had a ledge of ice eighteen inches within the porch-like entrance to it.
" 29	He-bear	At hut		By Armitage. Was "going for" the dogs, and when shot had approached within a foot or two of "Räwing" with his mouth open. Had the remains of a seal in his stomach. He was killed within ten yards of the hut on the top of the snow-bank.
" 29	52 looms	On talus, C. Flora		
" 31	He-bear	Snow-slope of cliff near hut	30 yards	Killed with one shot from .303 sporting rifle ("Tweedie" bullet). <i>Course of bullet:</i> Entered slightly to the right of middle line of neck in front of the windpipe. Passed upward, backward, and slightly outward through the windpipe and gullet, which were extensively lacerated. Passed through the transverse processes of the third and fourth cervical vertebrae, which were shattered, leaving the cord untouched, but causing much hemorrhage into the canal. It then passed backward through muscles of the neck, and then through the muscles of the back between the scapula and the ribs, and the bullet was found in the muscle opposite the seventh rib about three inches from the vertebral column. He was in a very thin condition, with no blubber under the skin or fat in

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895				
June 1	Glaucous gull, ivory-gull	C. Flora		the abdomen. Nothing was found in the stomach. Shot by Jackson. Specimens. <i>Contents of stomach</i> : Fish-bones, flesh, and feathers.
" 4	She-bear	Snow-slope of cliff near hut	35 yards	Disabled by a shot from .303 (solid government bullet). It entered back on left side, about three inches from spine. Passed inward and downward through the muscles, fracturing seventh rib and wounding pleura of same side. Passed through spine, fracturing the transverse and spinous processes with arch of spinal canal of seventh and eighth dorsal vertebræ; then through muscles of right side, and part of bullet passed out through the skin two inches from spine, and part was found in the blubber near the skin. Fragments were also found among the broken bones of the spine and the muscles of the right side. Nothing was found in the stomach. Shot by Jackson.
" 4	13 looms	C. Flora		
" 7	11 looms 3 kittiwakes			
" 8	Glaucous gull	Do.		Specimens. <i>Contents of stomach</i> : Fish-bones, flesh, and feathers.
" 8	1 purple sand-piper			<i>Contents of stomach</i> : Quartz, basalt, leaves of saxifraga oppositifolia, and larvæ. Six parts larvæ, four pebbles about $\frac{1}{4}$ in. in red brown. Digested leaf of a moss. Quartz, eight parts; basalt, one part; digested and vegetable matter, one part.
" 9	1 purple sand-piper 1 "molly-moke"	Do.		Ditto. Shot by Jackson.
" 10	2 Brent geese	C. Flora		

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895 June 10	She-bear	C. Flora	35 to 45 yards	Three solid government bullets .303 from sporting rifle. A loom and partly-digested seal were found in the stomach. 2 ^d bullet entered left side of head, three inches behind eye. Passed inward, forward, and slightly upward, entering skull at the junction of squamous portion of the temporal bone and greater wing of sphenoid and frontal bone, a plate of which, two and a half inches across, was knocked off. It completely severed the forehead above the eyes, and the nickel of the bullet was stopped and embedded inside the ridge on outer and back side of right eye, from which several fractures extended. Shot by Jackson.
" 10	1 kitti- wake			<i>Contents of stomach:</i> Feathers (very small), probably its own; digested vegetable matter—a small quantity. (Specimen.)
" 11	41 looms 2 skuas (Richard- son's)			<i>Contents of stomachs:</i> Feathers and fish-bones. (Specimens.)
" 12	26 looms			
" 19	16 looms			
" 20	13 looms			
" 20	He-bear	Floe, C. Flora	80 yards	Killed after three shots from .303 sporting rifle. Shot by Jackson.
" 20	4 terns			<i>Contents of stomachs:</i> Shrimps only. (Specimens.) Shot by Jackson.
" 24	2 eider ducks	Cape Gertrude		<i>Contents of stomachs:</i> Shrimps, shells (pieces), basalt. (Specimens.) Shot by Jackson and Armitage.
" 25	32 looms	C. Flora (talus)		
" 27	He-bear	By flag- staff, C. Flora	30 yards	Killed by one shot from my .303 sporting rifle (soft-nosed bullet). <i>Course of bullet:</i> Entered an inch to left of median line under neck, opposite cricoid and thyroid cartilages.

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1895				<p>Took a forward, inward, and upward direction, wounding the external jugular vein, fracturing the thyroid cartilage extensively, and passed through it. It then passed through the cellular tissues and muscles, until it impinged upon the petrous portion of the right temporal bone, which it severely fractured, and passed through it into the brain (the whole of the nickel portion of the bullet was found in the petrous bone), sending fractures upward into the squamous portion of the right parietal, as well as forward into the superior maxillary bones. I carefully weighed the bear in parts. He was a fair-sized he-bear, and weighed 808 lbs., of which the skin and blubber and paws taken off at the wrist weighed 242 lbs.; shoulders, 58 lbs. and 55 lbs.; liver, 16½ lbs.; kidneys, 4½ lbs.; lungs and heart, 17 lbs. He had a semi-digested seal in his stomach. Shot by Jackson.</p>
July 7	10 looms	Talus,		
" 7	2 glaucous gulls	C. Flora		
" 14	She-bear	C. Grant	40 yards	Killed with three shots from .303 sporting and a shot from government rifle. Killed by Armitage and Jackson.
" 15	He-bear	Do.	30 to 120 yards	Got on to a low berg and died there, but was not recovered owing to a strong wind driving the ice on which he lay out to sea. Shot by Jackson.
" 16	♂ and ♀ skua (Richardson's)	Do.	}	Shot by Jackson for specimens.
" 19	♂ ivory gull	Do.		
" 19	Ivory-gull	Do.		
" 23	♂ glaucous gull	Top of C. Neale (700 ft.)		Specimen. Do.

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1895				
July 23	1 rotche	C. Neale		Specimen.
" 23	2 squas	Cape Crowther		Do.
" 24	5 dovekies	Top of C. Neale (700 ft.)		Do.
" 25	♂ and ♀ dovekies	Do.		Do.
" 25	♀ tringa (purple sand-piper)	C. Neale		Do.
" 25	Glaucous gull	Top of C. Neale (700 ft.)		Do.
Aug. 4	4 young looms	C. Grant		
" 8	27 young looms	Cape Stephen		Do.
" 10	2 red-throated divers	Bell Island		Fish found in the stomach.
" 10	Arctic tern	Bell Island		Specimen.
" 10	Red-throated diver	Mabel Island		Do.
" 10	Youngred-throated diver	Do.		Do.
" 11	Young dovekie	C. Flora		Shrimps found in the stomach.
" 13	27 looms	Do.		
" 15	142 looms	Do.		
" 15	She-bear	Edge of floe, C. Flora	35 yards	Killed by three shots from .303 sporting rifle (two "Tweedies," one nickel-covered regulation bullet). First shot entered right side of neck, passed backward, smashing the right shoulder into twenty pieces. It was found among the broken pieces of bone. The nickel-covered bullet passed through left buttock, through the intestines, cutting them in many places, through right lung, and lodged behind the right shoulder, having smashed the seventh rib in its passage. The bullet remained quite undamaged. Shot by Jackson.

Shot by Jackson.

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DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895 Aug. 16	146 looms	Edge of floe, C. Flora		The looms are feeding now on small fish, in addition to shrimps. They feed their young on the former chiefly.
" 17	134 looms	Do.		
" 17	He-bear (small)	Do.		Shot by Armitage with the government rifle (.303), "Tweedie" bullets (two shots), near the flag-staff. He had come ashore off some ice after a man who was sitting on a rock below the flag-staff.
" 18	142 looms	Do.		
" 19	94 looms	Do.		
" 20	4 walruses (1 young bull, 2 young cows, 1 calf)	Do. (on a piece of ice)		The ice coming down upon us and threatening to cut us off from the shore prevented us taking more than the four heads. Armitage and Jackson shot them on a piece of ice.
" 21	113 looms	C. Flora		
" 21	1 cow walrus	Do.		Shot on the ice by Armitage and Jackson, but the ice being in motion nearly crushed the boat, and we had to haul her out to avoid it; we were unable to reach the walrus, which drifted away east on the ice.
" 22	88 looms	Do.		(1123 looms from August 13th to August 26th for the winter larder shot by Jackson.) Only a very few rotches are left. A large number of looms have also left. Nearly all the looms have now gone. Only about a hundred are now left on the rocks. None are to be seen on the sea. There are plenty of kittiwakes, both young and old, on their nests still. None have yet left.
" 23	69 looms	Do.		
" 25	49 looms	Do.		
" 26	7 looms, 1 dovekie	Do.		
" 28	(1) 1 glaucous gull (young), 1 skua (Richardson's)	Do.		Specimens. (1) It had nearly the adult plumage, but with a few brown patches on the neck.
Sept. 1	2 Brent geese, 1 skua (Richardson's)	Do.		Specimens.

Shot by Jackson.

A THOUSAND DAYS IN THE ARCTIC

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895 Sept. 7	2 cow walruses, 1 young bull, 1 cub	C. Flora	(In the water)	The two cows and the young bull were secured, but the cub sank when shot. Killed with solid bullets from .303 rifle. <i>Contents of stomachs:</i> Quartz and basalt, pebbles, bivalves, and broken-up shells. Shot by Armitage and Jackson.
" 7	1 young glaucous gull	Do.		Specimen, shot by Jackson.
" 12	1 cow walrus	Do. (on a piece of ice)	40 yards	Killed with one solid bullet from .303 through back of head. We could only take the head, as the ice was coming down upon us. The bullet perfor- ated the atlas (right lamina) and spinal marrow, and out through the ligament on the other side, without splintering the bone. Shot by Jackson.
" 18	2 young ivory-gulls, 1 adult ivory-gull 1 young "molly- moke" (fulmar petrel), 1 snow- bunting	C. Flora		Specimens. In the stomachs of the ivory-gulls were found some shrimps and a bivalve- shell. Shot by Jackson.
" 23	9 young ivory-gulls 1 young glaucous gull, 1 snow- bunting	Do.		Specimens. Laminaria, fish, and broken-up shells found in the stomachs of the ivory- gulls. A tape-worm was found in the intestines of one ivory-gull. Shot by Jackson.
" 25	3 young ivory-gulls	Do.		
" 27	1 young kittiwake	Do.		Specimen. }
Oct. 13	1 adult ivory-gull	Do.		Do. } Shot by Jackson.
" 14	Do.	Do.		Do. }
Dec. 1	4 bull walruses	On floe, C. Flora	8 yards	Two young bulls, three-quarter grown, and two adults. Shot by Armitage, Dr. Koettlitz, and Jackson. They were ly- ing eight yards from the edge.

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1895				of their hole, separated by low hummocks. The largest walrus measured: Length, 12 ft. 6 in. (nose to tip of back flippers); girth (round chest), 10 ft. 6 in.; length of tusks outside the gums, 17 $\frac{1}{4}$ in. Two of them weighed about two tons each. All were in good condition.
Dec. 6	She-bear	C. Flora		Shot by Armitage and Blomkvist. She was pregnant with two small foetuses in the bifurcated uterus. (The uterus and foetuses have been kept as specimens in spirit.) The remains of a seal were found in the stomach. No thymus gland could be discovered. There was nothing to lead one to suppose she had been hibernating or intended doing so. The foetuses measured 4 $\frac{1}{2}$ in. long, and the head, nose, eyes, claws, and tail were clearly distinguishable. There must be two breeding seasons for bears—(1) cohabitation in March—(Jackson shot a male and female together at Bell Island on March 20, 1895)—and birth in the beginning of February; (2) cohabitation in the end of October or beginning of November, and birth in August; or else a bear must carry a cub about fifteen months.
" 7	He-bear	On floe	10 yards	Killed with two shots from .450 Henry Express. First shot, through neck behind the ear, knocked him over, but he floundered. Second, behind right shoulder through lungs. A quantity of blood in stomach. Blomkvist fired one shot into left shoulder. Skin, from tip of nose to tip of tail, measured 9 ft. 2 in.; brain weighed 18 $\frac{1}{2}$ oz.; fairly convoluted, quite as much so as a horse's. (The human brain weighs on an average 48 oz. to 50 oz., male; the female, 44 oz.) Shot by Blomkvist and Jackson.

A THOUSAND DAYS IN THE ARCTIC

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896 Jan. 15	1 She-bear, 2 cubs (half- grown)	On floe, C. Flora 300 yards south	12 yards	<i>Measurements on body—She- bear</i> (she was suckling still). Length along belly, 6 ft. 4 in.; back, 6 ft. 6½ in.; chest, 4 ft. 8½ in.; weight of brain, 17 oz. <i>Contents of stomach:</i> Remains of semi-digested seal (all bears); two pieces of paper (she-bear only). <i>Cub 1:</i> Length along belly, 5 ft. 2 in.; back, 5 ft. ½ in.; chest, 3 ft. 9 in. <i>Cub 2:</i> Length along belly, 5 ft.; back, 5 ft. 3½ in.; chest, 3 ft. 11 in.; brain, 16½ oz.; weight, 23½ lbs. Shot by Armitage and Jackson. Ar- mitage killed cub No. 1, Jack- son the she-bear and cub No. 2. The she-bear was not preg- nant. All in fair condition.
" 17	He-bear (very large)	Elmwood, C. Flora, (behind stable)	8 yards	Killed by Jackson with one shot from double .450 Ex- press rifle through the head. <i>Measurements on body:</i> Length along belly, 7 ft. 11½ in.; back, 8 ft. 2 in.; girth of chest, 6 ft. 5½ in.; girth of belly, 6 ft. 7½ in. <i>Contents of stomach:</i> Digested seal. Fairly fat. Weight of brain, 15 oz. <i>Measurements of skin, off body:</i> Length, 8 ft. 11½ in.; breadth, 6 ft. 10 in.
Feb. 1	He-bear (small)	C. Flora (300 yards from flag-staff)	5 yards	Found on May 25th at foot of slope below No. 1 Berthon. Through this bear "Råwing" came to his end. Brain, 14½ oz. Killed by Jackson.
" 28	He-bear	On floe	25 to 45 yards	Killed by Jackson (two shots, .303 rifle. <i>Measurements on body:</i> Length along back, 6 ft. 11½ in.; belly, 7 ft. 2 in.; across head between ears, 1 ft. 2 in. Old he-bear. Nothing in stomach. He was in fairly good condition, but had an old bullet-wound in the middle line just behind ears. Weight of brain, 16 oz.
Mar. 2	He-bear (three- quarter grown)	On floe, C. Flora (below flag-staff)	35 to 45 yards	Killed by Armitage and Jack- son. The latter put a shot in his neck, which penetrated chest; he laid on the ice for twenty seconds, but got up

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896				and staggered off. Each then gave him two more shots. He was a three-quarter grown he-bear; was in poor condition, but his stomach was full of semi-digested seal. The brain weighed 14½ oz.
Mar. 5	He-bear (three-quarter grown)	On pond, Elmwood	45 to 85 yards	Killed by Armitage and Jackson. The first shot placed in his neck. He struggled to his legs again, and three more shots were fired, as he died hard. They found on examining him afterwards both shoulders broken, the lungs perforated in several places, the heart pierced through the ventricles, a shot up the anus, and several bullet-wounds in the hind-quarters and ribs. He was in rather poor condition, and had nothing in the stomach but a little very dark bile, and the gall-bladder also was full of similar bile. He was very bold, and gave chase to a man who first saw him. He marched boldly towards the house, in spite of all the dogs barking at him.
" 5	He-bear (full-grown)	On floe, below flag-staff	60 to 100 yards	Shot by Armitage, Dr. Koettlitz, and Jackson. Jackson photographed him first with a hand camera before killing him. He was in fair condition, but his stomach was empty.
" 20	He-bear (large)	C. Flora		Shot by Dr. Koettlitz.
" 21	He-bear (medium)	Do.		Shot by Dr. Koettlitz and Heyward.
" 31	He-bear (medium)	Do.		Shot by Heyward and Dr. Koettlitz. Brain weighed 17½ oz.
" 31	He-bear (medium)	Markham Sound	15 yards and 120 yards	Killed by two shots from .303 rifle. The first shot placed in his neck. Armitage then shot him in the shoulder after missing him with his first; second shot broke his back between the shoulders as he was going off at a fast rate. He came up to the camp with remarkable boldness, and tried to go for some dogs tied

A THOUSAND DAYS IN THE ARCTIC

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896				to an ice-axe after my first shot. I took a camera snapshot, $\frac{1}{10}$ sec. 8 stop, but the light was too bad (snowing, misty, and 9 P. M.). Weight of brain, $16\frac{1}{2}$ oz. Shot by Jackson and Armitage.
April 4	He-bear	C. Flora		Shot by Dr. Koettlitz. Brain weight, $18\frac{1}{2}$ oz.
" 22	1 young ivory-gull	Elmwood, C. Flora		Had the same black markings on the head and wings as the young gulls killed last autumn. It was in company with two other gulls which were quite white. Shot by Jackson. (Specimen.)
" 27	He-bear (medium)	Do. (12.45 A.M.)	12 to 60 yards	An old he-bear of medium size (7 ft. 4 in. from tip of tail to tip of nose along belly). Jackson took twelve negatives with hand-camera, the three last at a distance of from 10 to 15 yards, before shooting him. He then put a bullet through the lungs, but he made off. Armitage then broke his near hind-leg and Jackson his near shoulder, the same bullet also breaking his backbone. Discolored broken teeth, empty stomach, poor condition. Shot by Armitage and Jackson.
" 27	10 looms, 1 dovekie	Talrus, C. Flora		Looms are now coming on to the rocks in greater numbers. Rotches and dovekies have been there for some time before the looms appeared. Kittiwakes are now upon the lower cliffs. By Jackson.
" 28	1 young ivory-gull	Do.		Black markings on wings and head. (Specimen.)
" 29	8 looms	Do.		
" 29	He-bear (young, small)	On floe, C. Flora	70 yards	Photographed at forty yards with dogs playing him as he made off (8 stop, $\frac{1}{10}$ sec., overcast, 6.30 P. M.). As he was going off Jackson shot him through the flank, cutting his bowels in several places and smashing the right kidney. He staggered off seventy or eighty yards farther, and then

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896				
May 12	He-bear (medium)	On floe, C. Flora (near Bear Berg)		finished him. He was in poor condition, but an apparently young seal was in his stomach. He faced the dogs boldly for some time. Weight of brain, 16½ oz. Shot by Jackson. Stomach had some horse-dung and a little waterproof linen in it from some packing-cases. Weight of brain, 16 oz.
" 13	10 looms, 1 dovekie, 11 rotches	Talus, C. Flora		
" 16	12 looms, 12 rotches	E. Talus, C. Flora		
" 23	2 looms, 4 rotches, 1 dovekie	Do.		
" 24	11 looms, 3 rotches	Do.		
" 27	1 turnstone (cock bird)	Elmwood, C. Flora		Shot by Jackson near the pond at the hut. The only one seen in Franz-Josef Land.
" 28	1 eider-duck (drake)	West Point, C. Flora		When first seen was sitting near a pool of thaw water. No duck was to be seen. Contents of stomach: Pieces of shell (bivalve). Shot by Jackson.
" 28	1 purple sand-piper			
" 31	10 looms	E. Talus, C. Flora		
June 2	8 looms, 2 dovekies	S. Talus, C. Flora		
" 3	2 rotches	Summit of C. Flora		
" 5	11 looms	S. Talus, C. Flora		
" 6	He-bear (medium)	On floe, C. Flora	110 yards	Killed with one shot from .303 rifle ("Tweedie" bullet). Bullet passed through right axilla, cutting a part of the brachial plexus, passed through the apex of both lungs, cutting the descending vena cava and filling the thorax with blood. It then passed through the ribs on the left side and lodged in the left shoulder. Photographed before shooting, after mortally wounded, and after death with hand-camera. Shot by Jackson.

Shot by Jackson.

A THOUSAND DAYS IN THE ARCTIC

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896 June 7	36 rotches	Gully rocks	40 yards	<i>Contents of stomach:</i> Pieces of shell, moss, small grubs, ba salt, sand. All three were cocks. Shot by Jackson.
" 10	2 Lapland buntings ♂	C. Flora (behind Eira Cottage)		
" 10	1 Lapland bunting ♀	C. Flora (by Sharpe's Rock)		
" 11	1 Brent geese	West Point, C. Flora		Shot by Armitage.
" 12	2 Brent geese	Do.		Shot by Jackson.
" 12	5 looms	S. talus, C. Flora		Shot by Nansen. Jackson took a number of negatives of her before being fired at and after being wounded. She had thin milk in her teats, but was not pregnant. The hair on belly very thin. Probably had just got rid of cub. Loom skins in stomach picked up at the hut.
" 14	6 looms	Do.		
" 16	7 looms	Do.		
" 17	8 looms	Do.		
" 18	7 looms	Do.		
" 20	10 looms	Do.		
" 22	10 looms	Do.		
" 24	5 looms	Do.		
" 24	She-bear	By flag- staff, C. Flora		
" 28	17 looms	S. talus		Shot by Armitage with a rifle. <i>Contents of stomach:</i> Remains of a loom. When first seen was endeavoring to capture a tern. Was very wild. (Specimen.)
" 30	7 looms	Do.		
" 30	1 snowy owl	On hum- mock of ice near Eira Cottage		
July 2	19 looms	S. talus, C. Flora		
" 3	7 looms	Do.		
" 5	11 looms	Do.	Shot by Nansen, Jackson, and Armitage. Jackson and Nansen took a number of negatives of her as she stood at bay on the top of a berg.	
" 5	She-bear	On floe		
" 6	3 looms	C. Flora		
" 8	20 looms	Do.		

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896				
July 11	15 looms	C Flora		
" 13	19 looms	Do.		
" 16	16 looms	Do.		
" 19	13 looms	Do.		
" 22	7 looms	Do.		
" 23	7 looms	Do.		
" 25	8 looms	Do.		
" 28	12 looms	Do.		
" 31	8 looms	Do.		
Aug. 3	9 looms	Do.		
" 5	8 looms	Do.		
" 6	7 looms	Do.		
<i>For winter</i>				
Aug. 8	81 looms, 2 kitti- wakes, 2 glaucous gulls	Do.		Specimens. Do.
" 9	128 looms	Do.		
" 10	119 looms	Do.		
" 11	113 looms	Do.		
" 13	140 looms	Do.		
" 14	128 looms	Do.		
" 16	139 looms	Do.		
" 19	127 looms	Do.		
" 20	She-bear	Talus, C. Flora	80 to 200 yards	Shot by Jackson. Length, 6 ft. 1 in. from nose to root of tail. <i>Contents of stomach:</i> Grass and a little blubber. She was very fat. Brain, 16 oz.
" 24	163 looms, 46 looms (young), 80 looms (20 young)	C. Flora		
" 26	He-bear (medium)	C. Flora (Elm- wood)	5 yards	Jackson photographed him at eight yards' distance, and again when only three and a half yards off. He then had to hurriedly use his .303 rifle, and shot him on the right side of the head just in front and below ear. This knocked him over, but he half strug- gled on to his legs, and Armi- tage, who had come up, put a bullet through his abdomen, and Jackson again shot him through the neck, which fin- ished him entirely. Measured 6 ft. 9½ in. from nose to root of tail (back).

A THOUSAND DAYS IN THE ARCTIC

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1896 Aug. 26	She-walrus	On ice, C. Flora	30 yards	
" 26	Snowy owl	C. Flora		Was sick. Caught by Wilton.
" 27	He-bear (large)	Do.	30 to 40 yards	Shot by Armitage, the doctor, Wilton, and Jackson. Jackson first of all took a number of negatives of him with the half-plate camera and hand-camera. He had been feeding on the blubber of the walrus shot yesterday, and his stomach was enormously distended; the contents weighed between 60 and 65 lbs., and oil ran out of his mouth. Measured 7 ft. 7½ in. from nose to root of tail. Weight of brain, 19 oz.
Sept. 2	She-bear	C. Flora (on floe)	70 yards	Measured 6 ft. 3 in. from tip of nose to root of tail. Shot by Armitage and Jackson. The latter photographed her seventeen times before shooting her.
" 15	Ringed Seal (male)	C. Flora	25 yards	Shot by F. G. Jackson in the water near the flag-staff. <i>Contents of stomach:</i> Fish, broken shells.
Oct. 20	1 dovekie (adult), 10 dovekies (young)	Do.		By F. G. Jackson. All in winter dress. The brown on the feet and legs of the young ones had almost been replaced entirely by the adult red, and the white wing mark was mottled with black. The under parts white, but the back and back of neck white, speckled with black.
" 22	3 young dovekies	Do.		
Dec. 6	He-bear (full-grown)	Flag-staff, C. Flora		Shot by the doctor and Armitage. Stomach empty, but in good condition. Weight of brain, 19 oz.
1897 Jan. 16	He-bear (very large)	Near coal-bags, Elmwood		Shot by Armitage, Dr. Koettlitz, and Wilton. Measured 7 ft. 5 in. from tip of nose to root of tail along the back; to tip of tail, 7 ft. 11 in. Stomach contained loom-skins

GAME LIST

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1897				
Feb. 14	He-bear (medium)	Elmwood	15 yards	(picked up at the hut) and grass. Shot by F. G. Jackson near the stable. <i>Contents of stomach:</i> Gastric juice and small lumps of basalt.
" 20	He-bear (small)	Do.	35 yards	Shot by F. G. Jackson between the observatory and pond. <i>Contents of stomach:</i> A small piece of canvas. He was in very thin condition.
April 22	She-bear	Cape Ludlow	25 yards	Shot by F. G. Jackson at camp. Had followed the sledge tracks up on to the glacier behind C. Ludlow.
" 27	She-bear and two cubs	Cambridge Bay	20 yards	Rushed down upon our sledges as we were passing through some very rough ice. Shot by F. G. Jackson (one shot through the head).
May 17	She-bear	On floe, C. Flora	35 yards	Stood at bay upon the top of a small berg, where she was being teased by the dogs. Shot by F. G. Jackson (one shot through head). A quantity of grass only in stomach.
June 8	9 looms	Talus, C. Flora		
" 9	Lapland bunting	C. Flora		By F. G. Jackson. (Specimen.)
" 9	Shore-lark ♂			By Armitage.
" 10	1 Brent goose	Do.		
" 17	10 rotches	Gully Rocks		
" 20	He-bear	At the hut	20 yards and 90 yards	Shot by F. G. Jackson (5.15 A.M.). One shot through jaw and throat; second shot through the shoulder; third shot through neck, breaking spine. His stomach was full of grass. Photographed.
" 24	2 Arctic terns			Specimens.
" 27	17 looms, 2 dovebies	Talus C. Flora		Do.
" 28	1 Purple sand-piper	C. Flora		

A THOUSAND DAYS IN THE ARCTIC

DATE	GAME	LOCALITY	DISTANCE	REMARKS
1897 June 28	1 Bona- parte's sand- piper			By Wilton.
July 1	He-walrus (young)	C. Flora		
" 11	3 cow walruses 2 bull walruses	Off C. Flora		
" 13	3 cow walruses	Do.		(One cow landed, two sank.)
" 13	1 young bull-calf	Do.		Weight, 187 lbs. Navel string still unhealed. Measured 4 ft. 4 in. in length; 3 ft. 8 in. in girth. Captured alive.
" 14	1 young bull walrus			
" 29	19 looms 1 Cub walrus	Do.		Captured alive.
Aug. 7	8 ivory- gulls (young)			Taken alive.
	10 ivory- gulls (young)			Specimens.
" 11	11 Poma- torhine skuas 1 Arctic tern			Shot by Jackson. 77° 30' N. Lat. 35° 15' E. Long.

CHAPTER XIX

PREPARING FOR OUR SECOND WINTER

August 13, 1895, Tuesday.—I have been thinking of yesterday's sport at home, and wondering if they got good bags on the moors. The sea is now very full of ice, and we have just got back in the nick of time. As far as we can see to the southward and eastward the sea is packed with ice, much of it being large floes. Whether the ice comes out of the fjords to the northeast or from the Kara Sea we have no chance of judging—probably from both. I started to-day to shoot looms for the winter and present uses.

Some of the dogs broke loose last night. Had their usual "mill," and killed "Sammy" and "Laughing." The former was a good bear-dog. I feel very sorry about it, poor old chap! He has given us many a good hunt, and was very keen.

Fisher is arranging and drying his botanical specimens, the doctor is skinning the remainder of the bird specimens we brought back from our late boating expedition.

In the afternoon Fisher and I went up to the talus to get looms for the winter. I killed one hundred and twelve to-day.

August 15th, Thursday.—I went up the talus, accompanied by Heyward as retriever, to shoot more looms. By three o'clock I had killed one hundred and forty-two. Fisher and the doctor came out later to help us to carry them back to the hut. About 5.30 P.M. we espied a bear on a drifting floe about a mile and a half to the S.S.W. I called out the boat's crew and manned the *Mary Harmsworth*, and pulled away to the floe edge. On seeing us she began to stalk the boat and eventually came within thirty yards, circling round, and several times stood up on her hind legs like a rabbit to try and get a better view of us. I put a shot from my .303 into her neck which dropped her. Armitage also shot her through the chest. It was a medium-sized she-bear,

A THOUSAND DAYS IN THE ARCTIC

which the doctor tells me was not in cub. We towed her back behind us to the shore, took the skin off, and cut up the meat during the evening. The sea in every direction is now full of ice, and very little water is to be seen. A remarkable change. It keeps on coming in from the eastward. The looms are now getting their young ones down to the sea. The youngsters jump off the cliffs, open their wings and skim; the old ones, and often a third, an interested friend I conclude, fly with it (I have never seen more than one young one go at a time), and sometimes support it by laying hold of its tail with their beaks. Occasionally they fall before reaching the sea and come down heavily but apparently without damage. We have often given them a helping-hand onward on such occasions.

The weather is to-day sunny and quite warm, but the young ice now forms on the sea as soon as the sun gets low.

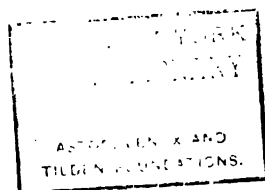
We are very busy making preparations for the winter. I intend to try and keep scurvy-grass fresh and green by freezing it, for making salad for winter use. I think the bulk of the ice which now blocks the sea here comes out of the Kara Sea which possibly does not break up till the end of July to the east of Wilczek Land.

August 16th, Friday.—The doctor and I went up the talus to get looms. I killed one hundred and forty-six to-day. Child has been engaged in taking time for Armitage for a "lunar," Fisher in attending to his botanical specimens, and Armitage in the afternoon in skinning looms for the winter helped by Blomkvist.

I have obtained for specimens several small fish while shooting looms, which they had in their beaks. One species I think is a young ling, or cod, and the other looks very like a stickle-back. No seals or walruses have been seen for some days, none in fact since our return. The sea is now quite as much encumbered with ice as it was this time last year. We only just got back in time. Now nothing is to be seen but ice in any direction with occasional streams of water. During the night, hearing a rowl, I went out and found "Carlo" and "Räwing" murdering "Growler," and the square of dogs pulled about, each trying to get a bite at the unfortunate animal, which I rescued, getting bitten in three places on my left hand in doing so. "Growler" is badly mauled and I fear won't live. These Samoyed and Ostiak dogs are little better than wolves, and soon there will be none left but



LOOMS



PREPARING FOR OUR SECOND WINTER

the strongest (or luckiest) dog. They have a cowardly way of falling upon a single dog and mauling it to death. We have suffered all our losses, except two, owing to this cause. It seems impossible to stop it.

August 17th, Saturday.—I went up the talus to get looms, and killed one hundred and thirty-four to-day. I was joined by Fisher



SHOOTING LOOMS

later in the afternoon to help to collect them and bring them home.

The doctor and Blomkvist are engaged in getting the blubber off the last bear, Child in fitting up the stove in No. 2 hut, Armitage in working out astronomical observations and in skinning looms for the winter. His feet have not yet recovered from our three days outing in the boat during the gale off Cape Lofley; the doctor considers his affection rheumatic. Blomkvist also complains of rheumatism.

While away a bear came ashore from the ice at Flagstaff Point, where Armitage administered a couple of bullets to him. We skinned and cut him up after dinner.

August 18th, Sunday.—Fisher and I constructed a freezing-

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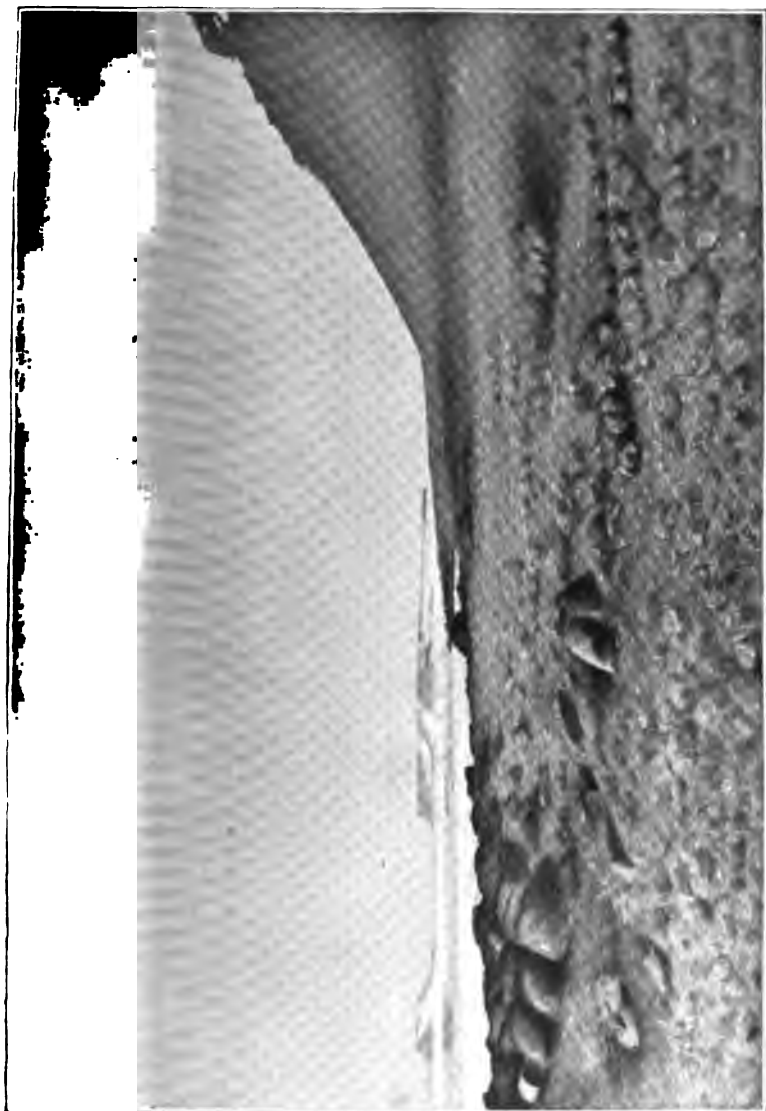
chamber in the floe-berg at the point, for the scurvy-grass (*cochleria fenestrata*). After lunch he and I went up the talus to continue my loom-smiting for the larder. I shot one hundred and forty-two under three hours, and as a trial I shot and bagged ninety-two out of a hundred consecutive birds, all flying shots. Out of the odd eight, six managed to reach the sea, into which they fell; two, I think, I missed. I think I could kill a hundred in succession with a little care in avoiding too long shots. I had the black pony out in a sledge to bring them in. "Growler" died to-day from his wounds received from "Carlo" and "Räwing" two nights ago. "Carlo" and "Räwing" are deadly enemies, but the occasion of a murder being so attractive, and their tastes in this matter so agreeing, they joined hands to pull the event off. It was a case of fellow-feeling making them wondrous kind. These dogs are an awful nuisance.

A bear was spotted on some floating ice about half a mile from shore about midnight. As all the chaps were asleep I went after it in the canvas boat alone, but failed to get a shot, being cut off by his crossing the ice.

It has been snowing all the evening and looks very wintry, and feels so.

August 19th, Monday.—Sent all the expedition except Armitage, whose feet are still bad, out collecting scurvy-grass for freezing for the winter. Scurvy-grass, so called owing to the old belief that it was a great preventative of scurvy, probably as scurvy was considered to be caused by want of vegetable food, is a fleshy-green plant with a white blossom growing close to the ground, and has rather the character of mustard in appearance and flavor. It makes an excellent salad, or, when boiled, much resembles spinach. I put the two boats in order for launching at a moment's notice in case of either being required quickly for a bear or walrus, and then went up the talus and joined them.

After lunch the doctor and Blomkvist went on getting the blubber off the bear's skin. The blubber we use for burning in the hut with the little drift-wood we can collect. It is very smoky and dirty, but we are running very short of coal, and I am using as little as possible. Armitage skinned looms, and I, taking another man with me, went up the talus and shot ninety-four. Blomkvist, at six o'clock, brought out the sledge and black pony to bring in the birds.



VIEW IN SUMMER TO THE WESTWARD FROM OUR HUT

PREPARING FOR OUR SECOND WINTER

Heyward is doing the cooking very fairly indeed now.

August 20th, Tuesday.—The doctor is engaged at the bear-skins. Poor doctor! We all keep so well, he really has nothing to do medically, and even the ponies, dogs, and juvenile bears have now failed him. He is very good at preparing the skins;



CLEANING A BEAR-SKIN

he might have served an apprenticeship he is so expert. He gets plenty of practice here. He can turn his hand to anything, and is most neat and thorough in all he does. Blomkvist is engaged in feeding the ponies and dogs, and in taking the former out to graze; Fisher in arranging and pressing the botanical specimens.

At 4 P.M. I was on the point of going off to shoot looms when I sighted some walruses on the ice to the southward. I called out the crew and launched the boat, and Armitage and I succeeded in shooting all four (one young bull, two young cows, and a calf),

A THOUSAND DAYS IN THE ARCTIC

but owing to the ice moving rapidly east we ran considerable risk of being cut off from the land, and consequently could only secure a portion of the meat. We tried at first to tow the whole four to the shore on the piece of ice upon which they lay, but found it impracticable. They are lumbering brutes to haul about; the four probably weighed about three tons!

August 21st, Wednesday.—Armitage and I have been engaged in fixing a tide-gauge near the floe-berg at the point to take tidal observations; the doctor with the bear-skins; Fisher and Child in clearing out the boxes in the corner by the rock behind the hut. And later on in the day Fisher and Blomkvist fetched in a load of dry moss for firing with "Blackie" and a sledge, which we stacked on a flat rock behind the hut.

I, taking Heyward with me to collect the birds, went up the talus and shot a hundred and thirteen looms. About 4 P.M. I saw two walrus on the ice off Leigh Smith's hut. We manned the boat and I killed one at about seventy-five yards range, but the ice closing in around us quite cut us off from it, and we had to haul the boat out to prevent its being crushed, and to get into open water again had to drag it over the ice. The ice with the walrus upon it drifted away rapidly to the eastward. It is a dangerous quarter here to be out in a boat among the ice, as it is constantly moving rapidly either east or west with the spring tides, which run fast, and a boat runs considerable risk of being crushed, or of being forced out to sea.

August 25th, Sunday.—Fisher and I went up the talus after looms. These we are hanging round the hut, where they soon become frozen and will remain so for the next nine months. The snow has rendered climbing very difficult. In places at the top it lies four feet deep. I bagged forty-nine looms. The great majority have now left the cliffs and I expect the remainder to depart for the south shortly. The young looms are now coming down very fast. I noticed to-day five old birds helping a young one to the sea by flying with it; on the young one reaching the water in safety all but one flew away. I have on several occasions noticed as many as four birds conducting a youngster down. It is really a very pretty sight, and I always give the convoy exemption from a shot.

August 26th, Monday.—The weather still bad. Has been snowing all night, and off and on most of the day, with a thick mist.



MR. HARRY FISHER AT WORK AT THE BOTANY

PREPARING FOR OUR SECOND WINTER

I spent the morning nailing painted canvas on the roof of the hut to keep out the wet from sudden thaws.

The doctor is engaged with the walrus heads. The ponies cannot now get at any grass, as it is deeply covered with snow, and were not taken out to graze to-day.

We began our tidal observations to-day, neap-tides being now on. Blomkvist, Armitage, and Child have been engaged in skinning and hanging up looms to a rope passed round the outside of the roof and made fast at the corners. Our hut is literally festooned with birds, and they make quite as grand a show as a poultry-shop at Christmas. In the afternoon Fisher and I went up the talus to try and get more, but they have nearly all of them departed, and I should not think that more than a hundred are now left on the whole of the cliffs. I only shot seven looms and one dovekie. I have shot one thousand one hundred and twenty-three looms since August 13th, so that we are sure of a good larder for the winter! We still want bears for ourselves and the dogs.

It is with a feeling of sadness and regret that we see the birds wing their flight for the south—to home and sunlight; how we wish we could send a message by them to our dear ones there! The high cliffs that through our brief summer (although the highest temperature experienced has been only eight degrees above freezing-point) have been covered with bird life, and their cheering cries have recalled to us pleasant memories of rooks building in the high elm-trees, of green meadows and thickets, and the song of birds. Many a time when seated with my gun on the steep talus of Cape Flora I have been lulled into a day-dream, and in my mind's eye have fancied myself back at the covert side watching the pheasants running about among the brambles, or a hare timidly crossing a glade, when suddenly the sound of ice-pressure to seaward, or the fall of a snow-slide from the cliffs above, have recalled me to my surroundings of snow and ice, of animal and vegetable life feebly struggling with the forces of the white, death-like king of the north.

Those cliffs are now silent, grim, and white, and their solitude will remain unbroken for many dark, dreary months of gale and snow-storm and bitter cold. How we shall welcome the cheering "caw" of the loom that breaks the silence next April! May we all be alive and well to hear it.

A THOUSAND DAYS IN THE ARCTIC

August 27th, Tuesday.—Snowing most of the day, and very misty and overcast. Blomkvist engaged in fetching in dried moss for firing with the ponies and sledge. I tried the ponies with dog-biscuit. They appear to eat it with relish; in fact, animals seem to adapt themselves to circumstances in the Arctic almost as readily as man. I have only about a quarter of a ton of hay left, which I am using sparingly.

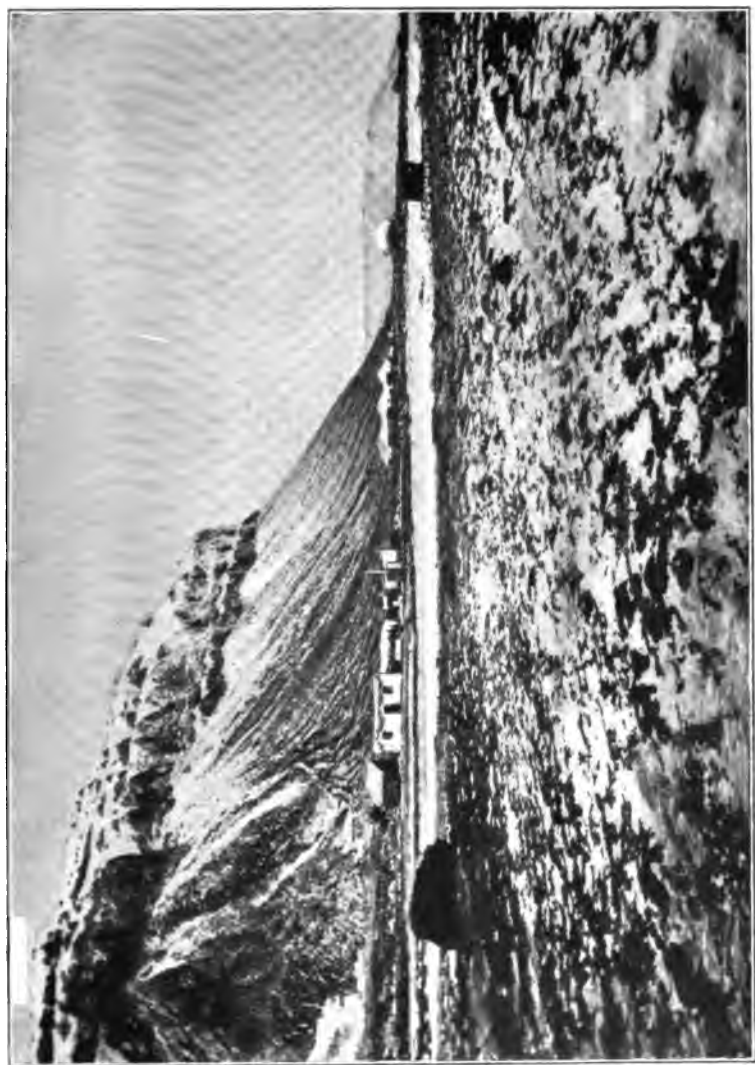
The sun sank at midnight at sea-level.

August 28th, Wednesday.—Fisher and I went east beyond Sharpe's rock and levered a quantity of drift-wood (all very old pine) out of the soil with crow-bars. Of course, there isn't a single living tree or even a shrub in Franz-Josef Land, and nothing grows higher than six inches from the ground. I took my gun and shot a skua and a glaucous gull (the latter, a young one of last season, apparently with the same plumage as the adult, with the exception of a few gray feathers about the neck).

The sun showed itself this morning and visibly affected the snow on the southeast side of the talus. As I considered it possible to obtain a little more scurvy-grass for freezing for the winter, after lunch I despatched all hands to search for it, and by scraping away the snow they succeeded in getting a good quantity, which I deposited in our ice-cellar in the floe-berg for our winter use. This ice-cellar is a natural cavern formed in the floe-berg when the blocks of ice composing it were crushed up together. It is about five feet deep by thirty inches wide. We blocked the entrance with empty coal-sacks.

Fisher and I continued our work in the enclosure, and also built up the wall of packing-cases and empty flour and biscuit casks behind the hut to protect it from the wind. We also went on with the work of making a road through the bowlders of the raised beach to the floe-berg for us to drag the sledges loaded with ice during the winter.

The negatives I took in the hand-camera during our late boat journey are coming out very unsatisfactorily. The camera having done everything possible that it should not do. In many cases the cards between the films have got crumpled in changing and have lodged in front of the lens, and in others the exposed film has failed to move from the front of the camera but has jammed there. None of us can discover any cause for this,



OUR SETTLEMENT IN AUGUST

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PREPARING FOR OUR SECOND WINTER

except that the mechanism apparently often fails to act properly.*

August 30th, Friday.—The doctor, Fisher, Blomkvist, and I were occupied all day in clearing the cases of tinned meats out of No. 4 and No. 2 huts, and in building a wall of nine feet high between the dog-kennel and the hut in the hope of preventing the constant huge drifts of snow which so bothered us last winter around the hut. It will, at all events, stop the driving snow from the E.N.E. which is apparently the prevailing wind during the autumn and winter. We also made a second wall to prevent snow drifting into No. 2 hut from the same direction.

Armitage took the tidal and meteorological observations and skinned looms. I developed negatives taken on the boat journey, which are now coming out very well indeed, and no mishaps have occurred among the second lot.

The sun at 10 P.M. being very close to the horizon gave very striking effects, shining through a break in the heavy, cloudy sky, and tinting the ice and sea with a rainbow of colors, and the sky around a deep rosy hue. It also cast a rainbow upon a bank of dense mist upon which its rays fell, coloring like fire the smoke-like mass, giving quite the appearance of a huge conflagration, and lighting up with wonderful colors the irregular ice-floes and the high white glaciers in the distance. Even in the Arctic we get lovely coloring sometimes. No more beautiful rainbow effects can possibly be imagined than the glorious band of color that spanned an arch over the clouds of mist. This very mist gave it a soft ethereal hue and lent a certain delicate unreality to the scene. It was a fine picture.

August 31st, Saturday.—Rained heavily most of last night, much to every one's surprise, as we all thought that rain was over for a long time to come. There is never very much, just a few days in the summer upon which rain falls. The thermometer rose to 35° F. with a northeast wind, which is remarkable. A northeast wind has caused a rise in temperature several times recently. A disagreeable drizzle has fallen all day with a dense mist, the sort of thing one enjoys on a Scotch moor, but here we have no grouse and no heather to make up for it. The rain, as

* *September 16th.*—I find that this is due to the spiral spring getting weak. I have stretched it out and it now acts properly.

A THOUSAND DAYS IN THE ARCTIC

usual, in spite of all our efforts to keep it out, poured through the roof again in a dozen places, chiefly into my cabin, drenching my guns, much to my annoyance.

The doctor, Heyward, and I turned out No. 2 hut, removing stores to No. 4, and cleared the place out for use as a bear-skinning place during the winter.

Armitage is employed as yesterday, and Blomkvist in cleaning out the house water-cask and filling it with water.

September 1st, Sunday.—After the drizzle and sleet stopped, the sun came out and gave us a pleasant and warm day, and although the thermometer did not rise above freezing-point in the shade, the sun melted the snow on the talus and made the thaw-water streams run again.

Fisher and I started out, intending to walk through "Windy Gully," but falling in with a flock of seventeen brent geese, out of which I shot two with a right and left barrel, we were delayed too long in getting one out of the sea (with an end section of the canvas boat) and in waiting about in the hope of getting a further shot, that we had to put off our walk till another day. I also shot a Richardson's skua, which in company with others was chasing the young kittiwakes.

The others went out and got more scurvy-grass for the winter. The ponies were turned out to graze for an hour or two this afternoon, as the sun had melted snow sufficiently to show some grass. Tringas and buntings are still here. But the looms-rotchies, and apparently the dovebies have left us; although I saw a single rotche to-day, the only one seen for some days past.

How very like one day is to another! More snow—less snow. Some birds—no birds. Frost—a gale. Cold—colder. Mist—dense mist. A bear—a walrus. Dusk—darkness. *Voilà tout!*

September 3d, Tuesday.—The remarkably mild weather still continues, but without rain to-day, a few showers of snow falling instead. Sent the doctor and Fisher out collecting scurvy-grass during the morning. I did a variety of odd jobs, and was engaged in photographing a sketch made by Fisher of Capes Ludlow and Lofley, and the cape beyond from the summit of Cape Neale, and also one of Cape Mary Harmsworth from a rough sketch taken when about six miles off, on July 28th, in the whale-boat, just before the gale began. After lunch Fisher and I walked away east to look for the geese, but we were unsuccessful.

PREPARING FOR OUR SECOND WINTER

The ice off here is still very heavy and packed. I am still inclined to think that most of it comes from the Kara Sea, as it is very heavy. Possibly the Kara Sea does not begin to come away till the beginning of August; we shall get a better idea next summer as to whether this is the usual state of things here at this time. It certainly has been so for two years.

Armitage took ten-minute tidal observations to-day, it being spring tides now.

September 4th, Wednesday.—The doctor and Heyward went west over the glacier. Fisher and I cast through "Windy Gully," meeting each other at the Miers Channel end, the doctor and I carrying guns in the hope of finding geese. We, however, were disappointed, and nothing was seen of interest except a young Richardson's skua, which I shot. The north end of "Windy Gully" was nearly clear of last winter's snow, and covered with small and large bowlders, and nearly devoid of vegetation. In summer it must be very wet. Some bones (jaw and vertebræ) of the right-whale with one or two plates of whale bone lie at some distance from high water-mark, one jaw-bone being nine feet above. Franz-Josef Land is without doubt steadily rising.

A considerable number of bivalve shells lie near the beach, similar in kind to those we have obtained before. We got back to the hut at 3.30 p.m. The wind to-day was very cool from the west, and snow fell occasionally.

Armitage took the tidal and astronomical observations at high and low water. Observations were taken every ten minutes.

September 6th, Friday.—This evening about 10.30 I noticed a large white bird seize a young loom on its way down to the sea and fly away with it. It was too dark to clearly distinguish the bird, but it must have been either a glaucous gull or a snowy owl. Owls pellets and feathers have been found on all capes which we have visited, the former with feathers and bones in them. I do not think it could have been the former, as I never knew them to take a young loom in the air, and the flight, so far as I could see, did not look like a gull's. Up to the present we have seen no owls. The geese have apparently gone off to the south, as none have been seen since September 1st.

The wind dropping this afternoon allowed the tide to bring the ice back against the land, and there is now very little open

A THOUSAND DAYS IN THE ARCTIC

water off here again. The ground is very hard frozen, and the pond bore Blomkvist to-day, who weighs over fourteen stone.

The doctor has been engaged at the walrus skins to-day: Armitage at the observations and in skinning looms; Child and Fisher at various odd jobs, and I in shifting cases of tinned goods, and in building the packing-case wall by the dogs' kennel and around No. 2 hut.

September 7th, Saturday.—We took the *Mary Harmsworth* round by Sharpe's Rock for the drift-wood that we dug out of the soil a few days ago.

Fetched two good loads of drift-wood, unloading it again by "Eira Cottage" and carrying it up the bank to be sledged up to the hut later on.

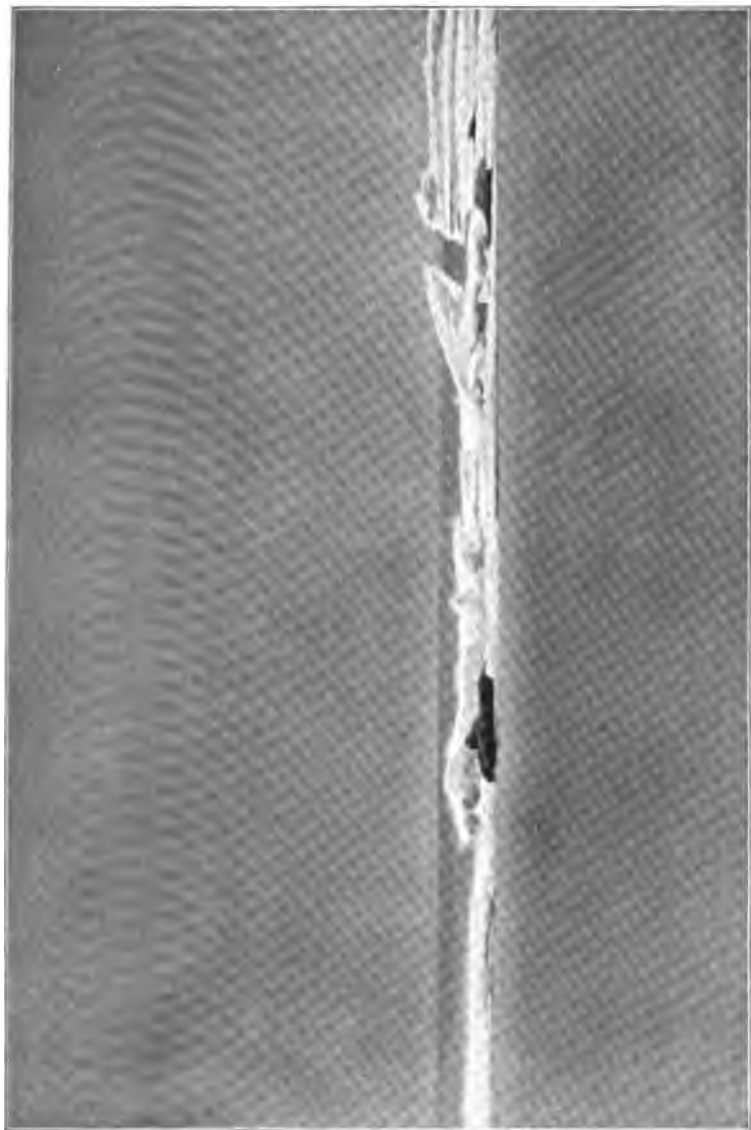
When returning with the last load four walruses were seen in the water. I shot them all, and we succeeded in landing three on the beach after a great deal of trouble, as they are a fearful weight. The fourth, however, a cub, sank immediately it was killed. I also shot a young glaucous gull for a specimen. Either it or its mother had just killed a young kittiwake, upon which it was feeding.

This is the anniversary of our reaching Franz-Josef Land, and I can't help feeling we have been very fortunate as regards health and spirits—the men have all worked well—yes, I think we may congratulate ourselves and one another!

Two or three dogs broke loose while we were away, and killed poor old "Overcoat"—so named on account of his very thick coat. They are an unmitigated nuisance. The ordinary English chains I have are quite useless to hold these dogs, and every chain has been broken a dozen times, and they are now repaired with thick iron wire.

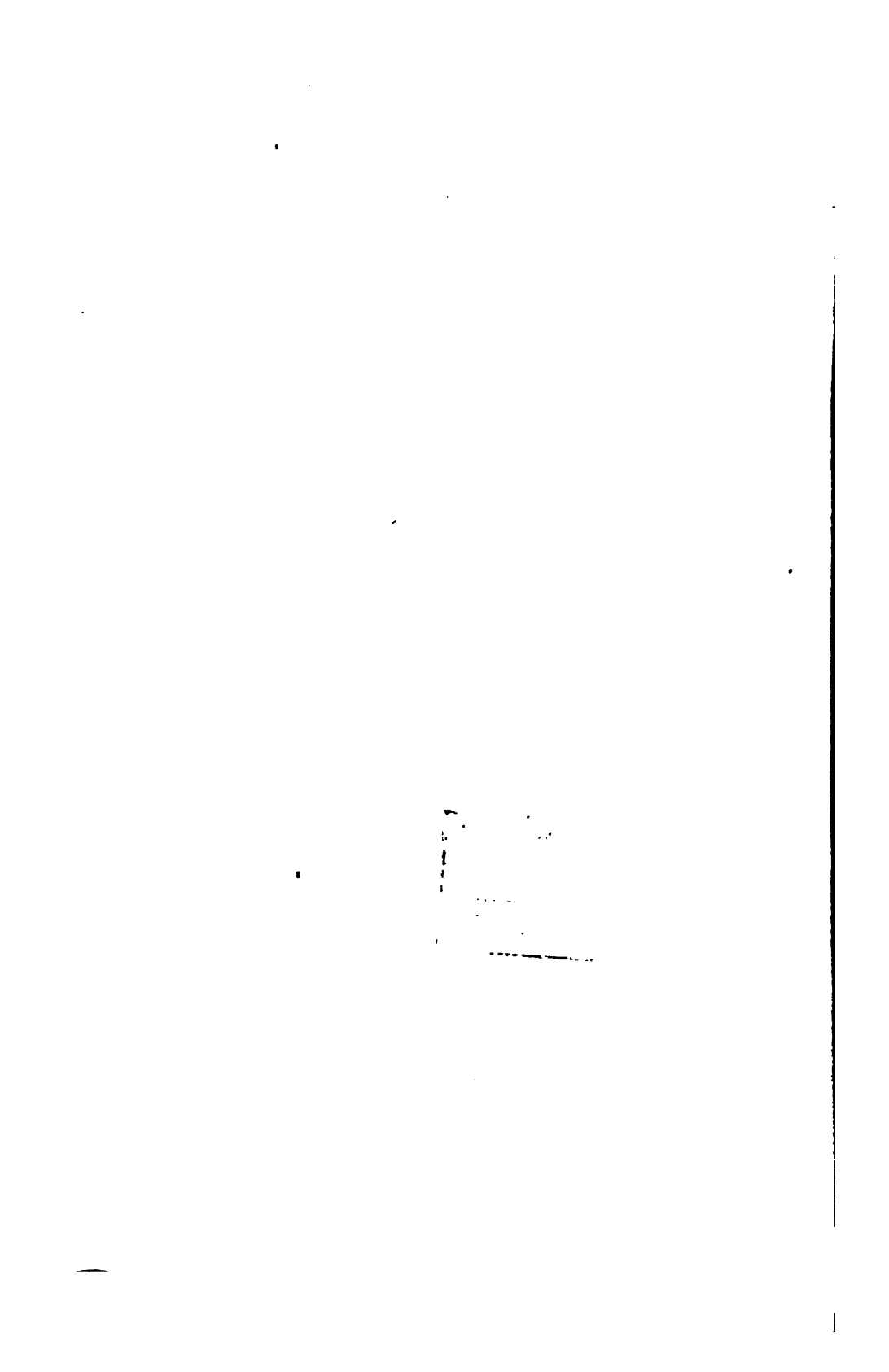
September 8th, Sunday.—We all went down and "flensed" the three walruses, and with the aid of the black pony sledged them and one of the hides up to the hut. The other two hides we left for removal to-morrow.

Another remarkable change of weather occurred to-day. The thermometer rose to 37° F., being very much warmer, and a little rain fell about 8 A.M. This is very different to what it was this time last year, and very unusual in this high latitude. Northeast and E.N.E. winds certainly, recently, have been warm winds



WALRUSES ON DETACHED PIECES OF ICE

Telephoto lens



PREPARING FOR OUR SECOND WINTER

here. This day last year we first landed on Cape Flora, and steamed to Cape Barents about 11.30 P.M.

My little Samoyad bitch "Sally" gave birth to four dog pups this evening.

The scurvy-grass appears to be quite unchanged up to the present, and I am in great hopes that the experiment of keeping a fresh green salad through the winter may be successful. It will be a great score if it can be done. The weather still continues wonderfully mild, and I had the three ponies turned out to graze again to-day.

September 12th, Thursday.—Fisher and I stacked the flags in the northeast corner of the enclosure by the house, and after lunch collected all the firewood about and stowed it upon two broken sledges to prevent it becoming frozen to the earth, for we must economize coal. The doctor has been busy all day with the walruses; Armitage has been occupied with the observations and in skinning looms, being helped by Blomkvist; Child has been making some iron mangers out of the empty preserved potato tins, as the ponies are fearful crib-biters, and have gnawed away all wood-work within reach, even pulling the floor of the stable up.

About 4 P.M. I saw three walruses upon a piece of ice some distance off the shore opposite to where our boat is lying. We manned her and pulled out to them, but something scared them and they made for the water; I, however, stopped the only one with good tusks just in the nick of time with a bullet through the back of the head from my .303 rifle. We could only take the head, as the ice was moving west with the ebb-tide and threatened to cut us off from the land; in fact, we only just got through in time.

None of my chaps are in love with walrus-hunting on account of the trouble the ice always gives us. We want meat, however, for the dogs.

September 14th, Saturday.—I set Fisher, Child, and Armitage to carry the drift-wood we had brought round and stacked by Eira Cottage up to the hut, as we were running short of firewood. Recently we have been burning blubber with it to economize. I put in most of the day at the wash-tub in No. 2 hut, as my soiled clothes have been rather accumulating since we left on the boat journey.

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The recent strong northwest winds have driven the ice off the land a little, and it now looks as if a ship might get in. Two "burgies," a skua, and a few kittiwakes were seen to-day, but no tringas, but one of the latter was seen by the pond yesterday.

September 16th, Monday.—Blomkvist, Armitage, and Child at work most of the day skinning looms, which are now frozen solid and have to be thawed first. The doctor was engaged with the walrus; Fisher at the botanical specimens. I photographed the three walrus heads, and finding that my hand-camera is behaving worse and worse, set to work to find out the cause. I found that it did not discharge the exposed films properly, but that they jammed in the front of the lens. This I discovered, after a good deal of trouble, was owing to the spring of the pressure-board having become weak and had crushed down. This, however, was quickly remedied.

The effect of the nickel-covered .303 bullets upon the heads of walruses is terrific. The fractures in the skulls are very extensive, and they have literally pulverized the bones in places extremely strong and solid though they are. The bullets in all cases are quite broken up.

In examining a bullet-wound in the back of the head of one of the walruses the doctor found that the atlas (first vertebra) had been perforated by a nickel-covered .303 government bullet without smashing the bone in the usual manner, but had drilled a clean hole through, only cracking the bone on one side slightly.

All birds but skuas, kittiwakes, "burgies," "mollies," and snow-buntings appear to have left us, and only very few of these now remain. Winter and darkness will soon be upon us, and the birds know it, and fly southward to happier and brighter climes.

September 17th, Tuesday.—I saw a flock of five terns pass the hut. As none of these birds (except one on Bell Island) have been seen since the end of June, doubtless these had come from the north, and only call here for a few days in passing.

I am now accustoming myself to the half-plate stand-camera, as I am getting very disgusted with hand-cameras, and shall probably take the former with me sledging in March, in spite of its weight and the trouble of frost-bitten fingers in using it. The results are far more satisfactory, and I consider that photography is of the greatest importance in undiscovered country such as this.

PREPARING FOR OUR SECOND WINTER

September 18th, Wednesday.—Four young ivory-gulls made their appearance from the east as we came up from the boat. I started the doctor off at a run for my gun, and Fisher to a point half-way between the boat and the hut to relay him, and I met Fisher. Although the gun was fetched down in very smart time (under four minutes), the birds had nearly all cleared out. I, however, got a straggler, and after waiting about the point with the gun till dusk, I got another young one and an old one. Young ivory-gulls are very rarely got, so that I was particularly anxious to secure specimens. I also shot two "molly-mokes" (one young one) and a snow-bunting for specimens. Saw a tringa, too—probably a purple sand-piper—evidently on its passage south.

Young ivory-gulls have dark markings on the back of the wings, not unlike those of the young snowy owl, but fewer in number. There are a few dark marks on the breast and back of the neck. The tail feathers are tipped with black, and there are dark markings round the eyes and about the mouth on the lower jaw. The legs and feet are dark in color. The ground-color all over the body is pure white. There are a few dark marks on the small feathers on the underside of the wings at the fore-joint. The beak is darker than in the adult. The adult bird is pure white.

September 22d, Sunday.—It has been blowing hard for the last two days, with driving and falling snow. This has driven the ice off the shore for about two miles, past which it does not seem inclined to go, showing there is much ice to the south.

The following are the results of our late tidal observations by Mr. Armitage :

August 26, 1895.—High water at 1.5 P.M. Height on tide pole, 1 ft. 7.2 in.

September 3d.—Low water at 4.28 P.M. Height on tide pole, 9.7 in. (Taken from ten minutes' observations.)

September 4th.—High water at 9.47 P.M. Height on tide pole, 1 ft. 6.8 in.

September 4th.—Low water at 4.35 P.M. Height on pole, 5 in. High water at 10.45 P.M. Height on pole, 1 ft. 7 in.

September 5th.—Low water at 4.7 P.M. Height on pole, 7.4 in.

The tides at Cape Flora come in from the south, and run to the eastward along the coast with a rising tide ; and go out and run

A THOUSAND DAYS IN THE ARCTIC

to the westward with an ebb tide. They are, however, greatly influenced by the winds in the above respect; and with a wind of force 6 and above from an easterly or a westerly direction will either remain neutral or flow slowly in an opposite direction to that which they would take if the weather were calm.

The winds also appear to affect the rise and fall of the tide.

The range of the tide appears to vary between 1 ft. 1 in. and 1 ft. 3 in.

The highest tide registered on the tide pole was on September 3d, at 9 A.M., 2 ft. 0.2 in.

The lowest tide registered was on August 27th, at 9 P.M., 2.2 in.

The tide appears to turn and run to the westward about twenty-five minutes before it has finished rising; and the same alteration occurs before it has finished falling. The tide moves very slowly at neaps, and is slack for a considerable period of time.

At springs it moves with rapidity at about two or three knots per hour, and there is practically no slack-water.

I have been engaged at the wash-tub all day, endeavoring to get level with an accumulation of dirty clothes. The difficulty in getting water is always felt on these occasions, as we have to melt snow over a small stove to obtain all the water we use.

September 23d, Monday.—Fisher, Armitage, and I got up the two Norwegian boats from below the steep slopes, and took them up to the hut. While so engaged a number of young ivory-gulls appeared, and I told Armitage to take a gun out and shoot what he could for specimens. He got four. I afterwards took my gun and shot five more and a young glaucous gull. I also killed two ringed seals in the water near the tide pole, but both sank.

We built up the wall of tinned meat cases that was blown down in the last gale, using snow and water as mortar. It doesn't take long to freeze.

The bay ice is now making fast, but the wind and current keeps the ice off shore constantly in motion and breaks it up.

The ice is now all back again, and promises to make rather a rough bear-hunting ground for us during the winter, and it will be difficult to run over in the darkness. I took some photos with the half-plate camera of the ice.

The sun sets at the pole to-day for the long Arctic winter—sun crosses the Equator.

PREPARING FOR OUR SECOND WINTER

We are using our drift-wood for firing, mixed with blubber. It makes an awful smell and smoke. Indeed, everything in the hut gets coated with black grime; and in spite of all our efforts to keep things clean, I fear a "first-class upper house-maid" might find fault with the result. The drift-wood is so wet and sodden that it won't burn alone, and the blubber, too, makes it go much further.

September 26th, Thursday.—The thermometer sank to zero during the night. Every one to-day has taken to "finskoes."* I have been engaged in making my map of the country to the westward from bearings taken on the boat journey; and Fisher in making a sketch of the peculiar aspect of the sky during the gale on July 30th, with the peculiar lathe-like marks and the odd phantom ship which we saw—or rather the three bare masts on the northern horizon.

Armitage is still working at the observations for position. The doctor was skinning birds all day. Two dogs broke loose during the night and, assisted by the rest of "Jinnie's" pups, now nearly full-grown, set upon the largest of them and killed it. They are a nuisance, and it seems impossible to put a stop to their murder game. This is the eleventh dog that has been killed in this manner. We have only lost two from disease since leaving Kharborova.

September 29th, Sunday.—Blomkvist came in to report two bears (a she and a this-year's cub) near the flag-staff. Armitage and I started out, and I also allowed another man to bring a rifle, provided that he kept the muzzle pointed away from us. We found the bears about two hundred yards west of the house, but on sighting us they made off across the new bay ice at a fast rate, with Armitage and I in pursuit, keeping out of sight as much as possible. (The other man returned, as he had come out—in slippers.) I left Armitage hidden behind some bowlders at the edge of the ice, and I started off towards the glacier to try and head them off, as they had again approached the shore. I was, however, unsuccessful, and although I followed them right across the glacier as far as "Windy Gully," and played "at seal" to try and bring them up, I never managed to get within four hundred yards of them, and they finally disappeared in the direction of

* Lapp fur-boots.

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Bruce Island. She-bears with cubs will always clear out if they can, but if brought to bay with dogs, or unable to distance us—which under ordinary circumstances they easily can—owing to having a small cub with them, like those I got in March on Mabel Island, are distinctly lively, and one has to keep one's eyes open to avoid getting into trouble.

September 30th, Monday.—At about 7.30 A.M. I heard the dogs barking loudly, and Blomkvist ran in to say that a bear and cub were near the flag-staff. I started out, with a coat over my pajamas, accompanied by Armitage. I found the two bears, evidently our friends of yesterday, on the bay ice below the flag-staff. The instant our heads appeared over the top of the slope they took to their heels. I planted a .303 bullet at a long range in the hind-quarters of the mother, and Armitage also paid her a similar attention, but without stopping her, and they cleared out in the direction of Bell Island over the ice. Blomkvist, who had joined us, stayed to watch them while we dressed and got breakfast. He then came in to say that the bears had returned towards the shore near the point to the west, and the she-bear appeared to be very badly wounded, being covered with blood, and had lain down behind a hummock. We started off with our rifles again, but found that they had again moved on, and by following their tracks along the face of the glacier, espied them at least a mile and a half off on the ice, making gayly for Windward Island, safe from us, as the ice is newly formed and very thin and unstable.

All the dogs, except the bear-dogs "Räwing," "Nimrod," "Sally," and "Jinnie," were to-day shut up in the dog-kennel for the winter. I did a little more photography and then went on with the mapping. The doctor was skinning specimens.

The weather has been clear and sunny, but with a stiff breeze and 21° of frost all day. Two young ivory-gulls, a young kittiwake, and a young loom, sitting on the bay ice, were seen to-day, having been left behind by their parents. To-morrow pheasant-shooting begins at home. If a bear would come our way, I wouldn't exchange him for the best pheasant-shooting in Norfolk. Still, I should like a day or two at the latter, if I could get back here again when it was over.

October 5th, Saturday.—It has been blowing in fierce gusts from the northward all the early morning, and has carried away

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part of the packing-case wall. I went for a walk towards Sharpe's Rock and then struck across the bay on the young ice. The wind dying down and the light being good, I brought out the half-plate and hand cameras to do some photography. While so engaged on the floe, Heyward reported to me that a bear was in sight towards the west point. As Blomkvist was exercising the ponies, I got my .303 rifle and jumped on "Blackie," and, followed by Blomkvist on "Brownie," to hold my "gee" when I required to dismount, I started in pursuit (the first time, I should say, a polar bear was hunted on horseback). Fisher followed on foot, with "Räwing" and "Sally" in a leash, in case I wanted them. I rode as far as the edge of the glacier and then dismounted, leaving Blomkvist in charge of the two ponies, and running across the young floe, as the ice was too thin for the pony, tried to cut the bear off. The strange object of a man on horseback had apparently scared him, and I was unable to get within reasonable shooting distance; he eventually took to the water and got out of sight. Armitage and the doctor saw another bear out in the bay while taking a stroll in the afternoon, where I had been in the morning.

These ponies are not exactly ladies' hacks, and their paces are not over comfortable. They are very straight in the shoulder.

After lunch Blomkvist and I made an imitation seal out of wood, to which I nailed some walrus flippers to make it more realistic, and daubed it over with black-lead and walrus fat. It is a wonderful production! Let us hope bears are credulous. This I have placed out on the floe. I think it may act as a decoy to bring up bears. Near it I have placed a very hard frozen walrus flipper as a second course. It will take a bear a long time to get his teeth into it. The bogus seal and this will afford him entertainment for a long time.*

I weighed thirteen stones eight pounds to-day when the doctor weighed us. We have all put on weight again.

October 7th, Monday.—I, helped by Fisher, took the scurvy-grass out of the ice-cellar in the floe-berg and placed it in a packing-case upon the roof of the hut, handy for use. To my

* A bear removed the dummy seal some weeks afterwards. I don't know if he managed to eat it. I hope not, for his sake—not that bears have delicate digestions, but I think our seal would tax them.

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surprise I found that in spite of the low temperature (we had had 16° F.), some of it, where it had lain in considerable mass, was unfrozen and quite wet. The plants had evidently acted as a hot-bed, the latent heat in it having prevented its freezing in the centre of the heap. The roof of the cellar was covered with ice-crystals, caused by the condensation on it of the moisture given off. We had some for lunch, and found it as fresh and crisp as ever. There is now, I think, no doubt as to the success of our experiment. After lunch I made our bear-dogs comfortable in empty biscuit-casks for kennels, and placed them in positions of vantage near the hut to give us notice should a bear approach. The doctor has been skinning birds (specimens), and Child has been repairing the anemometer, which was blown down.

October 10th, Thursday.—Fisher this morning saw a dovekie in its winter coat on the rocks at the entrance to Windy Gully. It was entirely white, he tells me. I did three hours' photography this morning, and experimented with the telephoto lens. There is very little light for photography now.

We burned the last of our blubber to-day, and as the drift-wood is too sodden to burn without it, we shall have to use coal unless we get a bear or a walrus at once. I am beginning to fear that the number of bears killed last winter and spring, when we got sixty, is the cause of their comparative scarcity now.

October 12th, Saturday.—Blowing very hard from the east all day. Not a speck of open water is now to be seen, the wind having brought in before it great quantities of ice. The pressure has crushed up the newly formed land floe east of the flag-staff point, now about eighteen inches thick, and high piles of ice, broken up into squares about twenty feet high, are heaped up on the shore, and forced up against, and in some cases even over the tops of bergs in the bay.

The hut, owing to shrinkage, is letting in chilly breezes in all directions, rendering the atmosphere very cool in-doors. I have been trying to remedy this by calking the open seams, using paper soaked in thin glue for the purpose, as we have no oakum left. In the evening I went on with the mapping. Fisher has been engaged all day with the botanical specimens, Armitage in working out the observations for position taken on our second sledge journey again, to insure accuracy. Child has been doing



SEA ICE CRUSHED UP BY PRESSURE ON THE SHORE AT CAPE FLORA

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a variety of small jobs, and the doctor has been relabelling the geological specimens collected on the boat journey.

They all played cards or read in the evening, as usual, and every one is contented and happy. The interior of our hut we have made very snug and comfortable, and the duties and routine of the day are performed as regularly and smoothly as clock-work. Each man has his allotted work, and does it well. We are always busy, and consequently the depression complained of on some Arctic expeditions is unknown to us. I try to keep civilization as present among us as circumstances will allow, and believe in every one being as civilized as possible in his daily life. This is very necessary in such a position as ours, for man quickly degenerates if he allows himself to do so, and it is by neglecting the little observances of civilized life that he imperceptibly starts on this downward course; one thing quickly leads to another, and total demoralization is not far distant. I can say positively that throughout our three years' sojourn in Franz-Josef Land the most fastidious lady in Belgravia might have looked in upon us without seeing the smallest thing to shock her feelings.

October 13th, Sunday.—An overturned berg off the shore now shows a surface to which a quantity of soil is adhering, containing shells, small bowlders covered with lichen, and other indications of land life, showing that this soil, etc., was picked up on the land. We are collecting specimens from it. The shore is lined with huge piles of ice-blocks from fifteen to twenty-five feet high, which have been forced up the inclined beach twenty or thirty yards by the gale. No one would credit the tremendous power exerted by ice without seeing some such proof. This, no doubt, occurred on Friday night, although no one heard the noise of it, but the roar of the wind would no doubt effectually prevent it. The bay where the *Windward* lay has escaped all this, and it is, I think, as safe a spot as any on the southern coast of Franz-Josef Land.

Heyward shot an adult ivory-gull to-day, and saw a "molly-moke."

CHAPTER XX

WE SUFFER SEVERE LOSSES

October 15, 1895, Tuesday.—The doctor was engaged all day in labelling the geological specimens. Fisher is examining the mud taken from the overturned ice-berg, under the microscope. So far he has found two or three diatoms. Armitage is still at the observations for position. In the afternoon I went on with the mapping. Heyward rides the three ponies out for exercise every day, and is engaged in making a canvas saddle, which promises to be a wonderful production, and must be the identical saddle that the Grand Llama of Tibet gives his visitors to ride upon. No sign of a bear, and the whole country appears now to be lifeless.

Not a teacupful of open water to be seen. I fear we shall have it frozen up in the condition the sea now is, which is very rough for the winter, if the easterly wind does not cease blowing, as it keeps the ice packed up tight. The sun was $1^{\circ} 30'$ high at noon to-day.

October 17th, Thursday.—I took the cameras and went out to a berg off Flagstaff Point, which had had a large quantity of heavy ice forced upon it, to try and photograph it. The light is, however, now so dim it is impossible to get a good negative of ice, even with the long exposures I am now giving, and all the plates turned out failures. After lunch I walked west round the point and examined the ice up towards Miers Channel; I found that the pressure had not extended up there to any great extent. My half-chronometer watch has recently taken to stopping when exposed to cold for only a few seconds, as in timing a photographic exposure. The swing of the fly-wheel is too short. I feel sure that the trouble is due to the oil in it having become thick. This must be guarded against on future expeditions.

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Fisher is working at the botanical specimens, the doctor at the geological, Armitage at the meteorological observations. Child has been trying to manufacture some stirrup-irons and spurs, the latter out of a pair of aluminium rowlocks. Necessity is the mother of invention, they say. All birds appear to have gone now.

October 19th, Saturday.—The sun at noon to-day, being now 10° on the other side of the equator (90° off us), sank for the long polar night of one hundred and twenty-two days—one hundred and twenty-two days of darkness! It was snowing and overcast the whole day, so he did not show to say good-bye to us; but about a quarter of the upper limb may show to-morrow.

I sent Fisher and the doctor with flags to mark out an even track on the land-floe for us to exercise on without falling over hummocks when the darkness becomes more intense. It quite recalls the polo-ground at Hurlingham, but that the surroundings are somewhat different. I set Armitage to hoist a large flag of sacking on the halyards below our jack on the flag-staff, to attract the curiosity of bears that may heave in sight of it and so bring them our way. In the afternoon I went on with the mapping. I hardly think the land or islands we sighted north of the 81° N.L. and to the north of Cape McClintock is Payer's King Oscar Land, as I then thought it might be. It was very misty, but it must be land closer at hand. Armitage went on with the observations, and Fisher and the doctor attended to the specimens.

October 21st, Monday.—I set the doctor, Fisher, and Armitage to fix flags to mark the track for our exercise in the dark time to come, which will soon be upon us. We all then went for a walk over the floe towards Cape Gertrude. We found the way there very rough, and bad for sledging the wood over. There are also several places where the ice had opened when it was crushed up by the easterly gale, and would hardly bear the ponies with safety.

After lunch I went on with the mapping, Armitage worked out the observations for position, the doctor examined and labelled the geological specimens, Child fixed up the anemometer and mounted it, Fisher did some mending on his own account.

It has been a fine, clear, still day. The weather this October

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so far has been a great contrast to that of last year, both in the absence of gales and of much snow. The sun showed by refraction to-day.

October 28th, Monday.—As I considered that one or two more marks are necessary to indicate accurately any movement in the glacier east from here, I sent Armitage and Fisher to place more flags on it. The doctor and I completed the road through the crushed-up ice on to the floe near Eira Cottage, and marked it



WALRUS HEADS

with six flags to be able to find it in the darkness. We then all went for a walk to the west.

After lunch Armitage worked at the observations, Fisher went on with the botanical specimens, the doctor made a list of the geological specimens, I completed a pair of leggings I have devised, and went on mapping.

Our three bear-dogs, "Räwing," "Nimrod," and "Sally," went off on their own account about 1 P.M. and have not yet returned. They have apparently come across a bear.

October 29th, Tuesday.—I walked out, accompanied by Fisher, to try and ascertain by the tracks in what direction the three missing

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dogs have gone. The light fall of snow and drift had, however, completely obliterated all marks of that kind. Armitage, Fisher, and Child had previously been engaged in a similar search. Heyward, riding the brown mare and leading the black pony, took them down to near Sharpe's Rock, where the high winds have exposed a little frozen grass. The latter is off his feed, and although I have tried him with hot oatmeal mashies, and some of our remaining hay, oats, etc., he can be induced to eat very little of anything. Grass, although he can get very little of it, he appears to have an appetite for. A tonic is what he requires, no doubt, but we have no gentian or any other drug suitable. I set the doctor to get out the dog-traces and a reindeer-sledge to take the dogs out and get them in form ready for the spring sledging. He brought a walrus head into the hut to thaw preparatory to cleaning and curing it. Our very small accommodation (12 by 13 feet) is usually lumbered up with all sorts of things being thawed or worked upon.

Armitage worked at the positions. It was well for Mr. Leigh Smith that he wasn't wrecked here in a season like the present, with no open water and no bears. He and his party would have starved.

October 30th, Wednesday.—Blomkvist announced to me this morning that the bay mare pony had been found hanged by her halter in her stall in the stable. On making inquiries I learned that this had come about owing to the manner in which it was fixed, having tightened round her throat. This is a dreadful misfortune, and reduces our power to travel north by one-third, and leaves us now with only two ponies, one of which is ill. We made the best we could of the matter by adding her to our larder, however. Having skinned the pony and cut the meat up into joints, we all went for a walk. After lunch the doctor cleaned the skin for curing. I continued my work with the maps. Armitage went on with his work at the observations.

Our dogs have not yet returned. I had "Rags" let loose today to try and make a bear-dog of him.

October 31st, Thursday.—Two of the dogs returned in the night, but "Sally," my little Samoyad bitch, has not come with them. I fear that a bear has killed her, or she has died from exposure, as recently she has been losing her coat, caused by giving

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birth to pups, and for some time I have kept her in the house at night on that account.

The doctor and Fisher took a team of seven dogs out on the floe for exercise and practice in driving them. After lunch Armitage went on with entering the meteorological observations. The doctor cleaned a walrus head, and Fisher helped me with the mapping. Child was engaged in manufacturing glass paper. I send every one out for a good walk every day unless the weather is too bad. Walking in the darkness and bad weather is rather a penance.

Cut through the bay ice in the bay, and on measuring it found it to be twenty-one inches. We began our two-hourly meteorological observations to-day, extending throughout the twenty-four hours. I took the first of the night watches, from 10 P.M. to 2 A.M.; the doctor, from 2 A.M. until 4 A.M.; Child, from 4 A.M. till 6 A.M. Armitage turns out at 8 A.M. to take the readings then. We now have breakfast at 10 A.M. instead of 9 A.M. Fisher will relieve the doctor and Child alternately. Armitage takes the readings throughout the day with occasional help from others.

"Blackie" is still suffering from irritation of the bowels, caused partly no doubt by the croton-oil I administered; it is the only purgative we have at all suitable. Horses require such a quantity of physic. I wish I had some aloes. I administered to him this morning one drachm of opium mixed up with flour and water and wrapped in paper. He is still off his feed and gives me considerable anxiety. After lunch, Armitage and I mounted the George's barometer in the barometric shed. We began on the scurvy-grass as a salad for lunch to-day. We shall use it twice a week for the present.

November 2d, Saturday.—The black pony is still clean off his feed, and gives me much anxiety, as this can't go on much longer. and he looks like a plate-rack. I managed after some trouble to administer about a quart and a half of warm oatmeal gruel with port-wine in it to him this evening. I tried a variety of devices to get it down him, but found a wine bottle the best to drench him with. This evening after dinner I gave him thirty grains of sulphate of quinine and one drachm of sulphate of iron in a bolus. I hope this may wake his appetite up.

The doctor weighed us all this evening. I weigh 14 stone (196

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lbs.). I evidently want a few bear-hunts to get me back into good training weight.

November 4th, Monday.—As the black pony has eaten nothing during the night, I drenched him with about a quart of oatmeal gruel this morning. The doctor, Child, and I cleared some more grass of snow and led him to it, but he would not touch it. On bringing him back to the stable I removed all snow from his manger, and put in the place of it about a quart of strong condensed milk. This will help to feed him, and he will drink this if he cannot get snow. Am really very anxious about him, as, owing to the accident, we have only two ponies left.

The weather is still very calm, and we have had remarkably little snow this autumn compared to last. In the same way as I thought the open water of last autumn and winter caused, to a large extent, the constant gales (often when it was blowing furiously half a mile from the edge of the water, on going close to it there was only a gentle breeze noticeable), so it probably did the heavy snow-fall. I now think that the ice being crushed up against the land, leaving next to no open water, possibly, for a hundred and fifty miles south of here, practically makes the climate continental in character at present, instead of insular. Anything more striking in the difference in climate between this autumn and last it is impossible to imagine.

But still the darkness is telling on sleep and spirits.

November 5th, Tuesday.—I led the black pony, in which there is no improvement, out for exercise, and to try and get him to eat a little grass. As I cannot get him to eat anything, I drenched him with about a quart and a half of rich milk (half a pound of milk) with three ounces of chlorodyne in it. After dinner this evening I gave him more milk with one ounce of chalk and three ounces of chlorodyne in it. He is evidently suffering from enteritis.

The moon and a few stars were shining brightly at noon to-day.

November 6th, Wednesday.—Blowing from a fresh to strong gale nearly all day, with driving snow, and a temperature of 10° to 15° F. Being overcast, and the driving snow rendering a walk on the ice a little difficult, we all did the "Row" (our row of flags on the land floe in the bay). I walked about four miles.

Three times to-day I have drenched the black pony with half a

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pound of condensed milk to about a quart of warm water with one ounce of chalk and three ounces of chlorodyne in it. He is still purged, but looks a little better I think.

November 7th, Thursday.—Still blowing strongly, with driving snow. I took four and a half miles exercise in the "Row" in the morning, and all the others likewise took a walk on the ice. In the afternoon the doctor stopped a tooth for me, the stopping of which had come out. He is wonderfully expert at dentistry. Armitage wrote up the observations.

I dosed the pony three times to-day with half a pound of milk, one ounce of chalk, three ounces of chlorodyne, and three ounces of spirit. He seems much the same. Blomkvist tells me he was perspiring early this morning.

Weather : Noticed a peculiar aurora a little after midnight. It showed from behind a stratus cloud from S.W. about 20° altitude, emitting at intervals puffs of cumulus-like aurora, which slowly made towards the east.

November 8th, Friday.—I walked five miles in the "Row" this morning; all the others also went for a walk on the ice. Still blowing freshly with driving snow, and about 16° F. most of the day.

After lunch Fisher worked at the botanical specimens, Armitage wrote up the meteorological observations, I wrote up and entered the observations, etc., taken on the spring sledge journeys, Child did various odd jobs.

I drenched the black pony with half a pound of milk, three ounces of chlorodyne, and three ounces of spirit, mixed in one quart of water, three times to-day. He has not been purged for twenty-four hours now, so I left off the chalk. He looks more lively, but won't touch a mouthful of anything of his own accord. He is being kept alive willy-nilly.

November 9th, Saturday.—The doctor and I went for a walk over the floe east to within a mile of Cape Gertrude. The moon shining brightly gave us a fairly good light. We got back at 3 P.M. Some brilliant streamers of aurora were to be seen in the S.S.W. sky at noon, at an altitude of 70° .

After lunch the doctor went on making a list of his geological specimens, Fisher examined some of his botanical specimens under the microscope, Child repaired my camp case, which had

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become much damaged by sea-water during the gale at the end of July off Cape Lofley ; I wrote up the meteorological observations taken on the sledge journeys.

I gave the black pony half a pound of milk and three ounces of spirit to-day three times, and this evening I added three ounces of chlorodyne. He still eats nothing at all.

November 10th, Sunday.—Blowing freshly from the east, with driving snow, increasing in force as the day went on.

We all did six laps in the "Row," being equal to nearly three and a half miles.

I drenched the sick pony three times to-day with milk, and had him walked about for half an hour on the ice. I only gave him alcohol and fifteen grains of quinine in the milk. He has eaten a little hay to-day, which is a sign of improvement.

November 11th, Monday.—Blomkvist came in to report to me, with a very jubilant countenance, that the black pony is eating his oats and hay in his usual manner. He will now be all right, I hope. I gave him, however, two doses of quinine (15 grains each) to-day to guard against a relapse of his appetite.

We all did the "Row" in the morning. I walked four miles. Arctic tread-mill would be a more suitable name than Rotten Row, I think.

November 13th, Wednesday.—Blowing a fresh to strong gale all morning, with the temperature about 15° below zero ; and at 4 P.M. it strengthened into a whole gale. We all did the "Row" before lunch, and walked about four miles. We availed ourselves of the shelter offered by the plateau, and only followed the flags half the distance.

November 14th, Thursday.—The stormy weather which began at the end of September last year appears to have been delayed until November this year. It has been blowing hard off and on the greater part of the day. Every one went for a walk in the "Row" this morning. The black and the brown ponies were exercised, and I rode the latter for a mile or two round the flags. The black pony is still very unwell, and to-day his appetite is falling off again. We administered twice an ounce of glycerine, and as that had not the desired effect, this evening I gave him three ounces of sulphur in some milk.

All of the men have been busy at various occupations. I was occupied with the pony most of the afternoon.

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November 17th, Sunday.—Poor "Blackie" is a perfect nightmare to me, for to lose him will be a very great loss to us. He is a most disheartening animal to doctor, for as soon as he is cured of one ailment he lapses into another. I hope, however, to save him yet.

We all took exercise on the ice this morning, walking about three and a half miles each.

The ice off shore has been in motion most of the day, groaning and shrieking like a host of demons. We had a small concert this evening, when Armitage and the doctor sang several songs, and we joined in the chorus. It made a cheerful evening and a change.

November 18th, Monday.—Blomkvist came in to tell me that the sick pony was lying down in his stall. I went out and found he was *dead*. The doctor and I made a post-mortem examination to ascertain his exact condition. It is evident to me that the 30 m. dose of croton-oil had really little affected his condition, and that he has been suffering from what amounts to stoppage through atony of the bowels ever since we began to doctor him. His case was evidently a hopeless one from the start, at all events without aloes, of which we have none. This is a most disastrous blow to us, and the fatality lately among our animals has been a very bad piece of ill-luck indeed. We have now only one pony left, and she is anything but a good one.

We all took exercise on the ice either in the morning or the afternoon. No bears up to the present. It looks as if we have shot them all out. I want meat for our dogs badly.

November 19th, Tuesday.—All the members of the expedition went for a walk on the ice this morning. I took out the bay mare and rode her for two miles and a half round the "Row" for exercise. I afterwards walked another two miles. It was very dark and snowing heavily.

After lunch Armitage wrote up the meteorological observations, the doctor finished his list of geological specimens, Child repaired and cleaned the musical box, I did odd jobs, and continued my writing and mapping. The thermometer sank to 25° below zero to-night—the coldest we have yet had this winter.

Several of the expedition have been complaining of sleeplessness since the darkness began. Nordenskjöld speaks of this trouble with his party during the one winter he spent on the

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north coast of Spitzbergen; and when travelling through the country bordering upon the White Sea and Lapland in the end of the winter of 1893 to 1894. I found the people at Vadso complaining loudly of the same thing during the Arctic winter there, although the darkness of their winter is not nearly so long or so intense as ours on the 80th degree. In fact, they always get some twilight at noon.

November 20th, Wednesday.—Blowing a fresh to a strong gale, with the temperature at 20° F. below zero. Rather cool. We all went for a walk on the floe round the "Row" in the morning with our faces carefully protected. As it is now very dark at mid-day and practically no difference between the light then and at midnight, I gave orders that all when going far from the hut are to take a fire-arm of some kind as a protection against bears, as they might sneak on a man in the darkness and be on him before he was aware of it.

About 8 A.M. I was told that the dogs ("Jinnie" and "Räwing") were barking on the floe opposite Flagstaff Point. I hurriedly tumbled into some clothes, and, accompanied by Armitage, started off with our rifles. By the sound of the barking I could hear that the bear was making for the open water, and we started off through the tumbled masses of crushed-up ice which extend beyond the bay floe. We were, however, unable to come up with him, and he made off in a westerly direction and finally crossed on to some thin new ice and disappeared. We found it very difficult to make our way through the rough ice in the darkness, our progress being more of the nature of clambering than anything else. "Jinnie" behaved very well, and is quite coming out in the character of a huntress. I bestowed upon her the Distinguished Order of the Bear Dog and the privileges of it.

November 22d, Friday.—Just as I was finishing undressing, after taking the meteorological readings at 2 A.M., the dogs began a loud barking, so slipping a coat on over my pajamas I went out to inquire the cause. On going outside the hut I heard a dog barking at the flag-staff, and what sounded exactly like the hiss of a bear in the same direction. I hurried in and got my rifle and started off, but soon found that it was a walrus in the open water that caused the disturbance among the dogs, whose blowing I had heard, and which at that distance sounded

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like a bear's hissing nearer at hand. About 9 A.M., as I was just finishing dressing, I heard "Nimrod," who is chained to a kennel heaped over with snow for warmth, just outside the hut, give his peculiar "bear bark," and a moment after Blomkvist, who had gone out to investigate, rushed in to tell me that a large bear was within a yard or two of the dog. I immediately seized my rifle and hurried out of the door and suddenly came upon "Mr. Bear" within three yards of me by the barometer shed, he having evidently left "Nimrod" to follow Blomkvist into the hut. I fired at him and knocked him over, and at the very short range must have burned his coat with the powder, but he picked himself up and sharply turning the corner of the coal sacks got out of my sight, and it was not until he was nearly across the pond that I could fire at him again. The distance combined with the darkness prevented this shot being an effective one. I followed him down the steep slope on to the floe, which he made for with the dogs at his heels. But I soon had to return, as I was hardly dressed for a bear hunt, having rushed out to rescue "Nimrod" in my shirt-sleeves, without a cap, and only fur slippers on, both of which came off directly I stepped into the snow, and the thermometer stood at 17° below zero. I returned to the hut, and quickly adding to my scanty attire, started off again, followed by Fisher and Heyward. The bear made off eastward, and although he several times stopped to make rushes at the dogs I was not again able to come up with him, as the extremely rough ice and the darkness put fast running out of the question. He evidently took to the water, and the dogs returned. Bears are again looking us up, but we are having bad luck with them.

November 24th, Sunday.—Still blowing hard, but the thermometers have risen to 18° below zero. We all went for a walk on the floe in the morning. I wrote in with ink my sledging journal after lunch. The others read and smoked. We have the moon back to-day, which we are very glad of.

The doctor has made a face-guard for me, as I have got a good deal bitten about the face, owing to my guard not lying close enough to it. He is an excellent tailor.

November 26th, Tuesday.—All hands went for a walk on the ice in the morning. I took out "Brownie" and rode her round the "Row" three and a half miles to give her exercise. The wind has shifted to north-northwest, and was blowing in fierce

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gusts up to force 10, driving hard, shotty snow before it. One particularly strong gust nearly toppled the pony and me over.

Every one is keeping in capital spirits and in good health.

November 29th, Friday.—Weather very overcast, with snow falling. The barometer is, I believe, lower than in any of the readings registered since we landed last September year, not even excepting those registered here during the time we were out in the gale in the whale-boat off Cape Lofley.

We all went for a walk on the floe in the morning. I gave the doctor instructions to take two of the 9 ft. 6 in. sledges on to the ice for us to practise dragging them with various weights upon them.

Armitage rigged up a new flag on the flag-staff to attract bears, as the sacking one fixed there some time back is blown to shreds. We did three and a half miles round the "Row" before luncheon.

As we have quite run out of ink, Child is manufacturing some which promises to be quite satisfactory. I fixed up a camera on the floe this afternoon with a rapid plate to get a moonlight photo of the tumbled-about ice on the floe. I gave two hours' exposure (clear sky and the moon full to-morrow). The moon was behind the camera and shining on the ice. Stop F. 11.

Child made a box to hold three cameras to protect them from wind, and I am giving them three hours' exposure for the hut and other buildings to-night. I think moonlight will give excellent results. I have not heard of it being tried in the Arctic before, or indeed satisfactorily anywhere.

I heard a fox "quaaking" up the talus to-night.

December 1st, Sunday.—Went for a walk on the floe round the "Row." While there I heard the barking of dogs out on the ice to the southward. By the manner of their cries I felt sure that they were either after a bear or else were teasing a walrus on the ice. I ran up to the hut and got my rifle, calling Armitage and the doctor to come also with theirs. By following the barking of the dogs and clambering over extremely high rough ice we arrived at the scene of the commotion. We found the cause of it to be four walruses lying on the ice, about eight yards from a large hole broken by them through some thin bay ice on the edge of the more solid floe. They were separated from this hole by some low hummocks. The position in which they were lying

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makes me feel sure that walruses are not afraid of bears. A few shots settled all four of them, and we returned to the hut (about a mile and a half off) to get help in cutting them up.

After having lunch, which was on the table, all hands returned to the spot (except Child, who had bruised his knee, and Heyward, who was occupied in cooking), with knives, etc., and a sledge.

We took off the four heads and removed the hearts, which are the best part of a walrus, and a quantity of meat, and after a great deal of trouble, as the ice was very rough for the sledge, and we had to carry the heads a great part of the way (they weighed over a hundred pounds each), we got them up to the hut soon after 9 P.M.

After dinner (the moonlight photographs taken yesterday have turned out very satisfactory indeed), I took out two cameras and fixed them up on the floe with rapid plates, and a two hours' exposure to get photos of the ice and the scene of our walrus shooting. It is a full moon to-night, with nearly a cloudless sky, and only a light breeze (force 1) blowing. I fetched them in after my watch. The largest walrus (all four were bulls) measured: Length, from nose to tip of hind flippers, 12 ft. 6 in.; girth (around chest), 10 ft. 6 in.; length of tusks, $17\frac{3}{4}$ in. outside the gums. The two smaller weighed about 5 cwt. each.

December 4th, Wednesday.—Blowing hard again from the east, with driving and falling snow, misty and overcast. This is a climate!—the most villanous in the world, I believe. We all went for the usual walk on the floe after breakfast. I also took "Carlo" out with a light Norwegian sledge to teach him to draw it.

December 6th, Friday.—Early this morning I heard the dogs barking out on the floe, and expecting that the cause of the noise was a bear, I sent Armitage and Blomkvist away to shoot it, which they succeeded in doing. It turned out to be a young she-bear with two small fœtuses in the bifurcated uterus. This upsets the theory that pregnant females always lay up throughout the winter. The remains of a seal were found in the stomach. She had about an inch of blubber on her. We sledged her up to No. 2 hut, and the doctor, Armitage, Blomvist, and I skinned and cut her up in the afternoon.

In the evening the doctor and Blomkvist removed the blub-

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ber from the skin. We shot no she-bears at all during last winter, neither did Leigh Smith the winter he was here—all being males. The doctor searched for a thymus gland, which is said to be present in all animals that hibernate, but could find none. I have no reason to believe that these animals do hibernate, but think that the females lie up for a considerable time before bringing forth their young.

December 7th, Saturday.—At 7.15 P.M. I was awakened by hearing "Nimrod" barking loudly. I hurried outside the house in my pajamas, and could then distinguish "Räwing" and "Jinnie" yapping vigorously out on the floe to the southward, about a mile off. I hurried back into the house and put a coat and pair of breeches on over my pajamas and tumbled into a pair of skin-boots. Hearing Blomkvist moving, I told him he could come too if he liked. Off we started in the direction in which we could hear the dogs barking, over some of the roughest ice and the deepest snow I have ever clambered through, and it being very dark, with a thick mist, walking over such stuff was especially difficult. We eventually came upon the bear, and found him standing near a berg with the dogs barking around him, and he making rushes at them, which they cleverly dodged. Blomkvist and I then separated, and I went up to the bear to within ten yards—I could not see him distinctly farther away—and gave him a bullet in the neck just behind the left ear, which knocked him over and ought to have settled him outright, but he floundered around and Blomkvist shot him in the right shoulder. This, however, did not satisfy him, and I administered another bullet behind the left shoulder, which laid him out. He was a large he-bear.

When returning to the hut I had the misfortune to fall backward among the pinnacly ice and to break my .450 Express rifle through the grip. I then turned in for an hour or two, only having had three and a half hours' sleep before "Nimrod" announced the bear. I left orders with Armitage to get the bear skinned in the open while warm, and to bring the hide in on a sledge (the ice is far too rough to sledge the whole body up to the hut).

We were all regaling ourselves and our bear-dogs (except "Nimrod," who was outside on guard) with a little afternoon tea and biscuit, when "Nimrod" set up a loud bark which sug-

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gested the proximity of another bear. I told Fisher to let "Räwing" out, and he went to the door with him, but returned in a second or two to tell me that there was a bear close to the door, which had made a dash at "Räwing" as soon as he was outside the hut. I got my rifle (.303) and ran out, but being half-blinded by suddenly going out from the light into the darkness, and by the rush of vapor from the hut, at first could see nothing, but in a second or two could make out a yellow object very indis-



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tinctly, which I knew to be a bear, about three yards off me. At this I fired. It unfortunately did not stop him, and although wounded (I afterwards found blood-marks) he got away. The dogs prevented my firing a second time by sticking to him closely until too far off. He went straight across the rough, tumbled-up ice beyond the direction of the flag-staff, and although Armitage and I struggled through the snow-drifts and pinnacles of ice in the mist and darkness for some distance we never got another chance, and the dogs at last returned.

Child is at work repairing my damaged rifle; the doctor, Blomk-

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vist, and I salted down the skin of the bear I shot yesterday during the evening, in No. 2 hut. I cannot understand the cause of this sudden influx of bears after such a long absence of them. There is a reason, no doubt. I have noticed before that a number have a way of appearing close together, and then an interval comes with none at all. May they roll in!

"Nimrod" came back from the bear-hunt with a wound on his rump and looking very much as if he had seen things which he did not at all like. He had had a near squeak, evidently.

December 11th, Wednesday.—There being less mist and an improvement in the weather generally, I sent Armitage out in charge of a party with a sledge to bring in the four quarters of the bear shot on the 7th, the meat of which had been stacked in a pile. The weather has been too bad since to do this before. I did various odd jobs and walked for two miles round the "Row."

After lunch I sent Blomkvist out to exercise "Brownie" in a sledge on the ice, and I took out "Carlo," putting an additional forty-four pounds on the sledge to-day. He is doing very well, and I shall make him a useful member of society yet. The doctor went on with the bear-skin. Child went on mending my rifle stock. Armitage wrote up the observations.

Only a faint orange streak was to be seen on the southern horizon at mid-day to-day (the sky was then quite clear), which gave no perceptible light, and it is quite as dark now, and has been for some time past, at mid-day as at midnight.

December 12th, Thursday.—Being a nice, calm, clear morning, although very dark, I sent Armitage out with a sledge and party to bring in the rest of the bear shot on the 7th. When it arrived I cut it up, keeping the best parts for ourselves and the rest for our dogs.

I took "Carlo" out in his sledge, adding another sixty-four pounds to his load. He drew this, but it is too heavy for the new hand at present, but his drawing powers may improve by-and-by. The doctor finished the bear-skin, and we salted it down and tied it up.

After about 10 P.M. there was a report that the dogs were barking on the floe. Armitage and I started off, and I gave Child permission to come, too; with a rifle. We could, however, hear nothing, so I let "Nimrod" go, hoping he would guide us, but he made straight for the open water, where I could hear walruses

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blowing and grunting. After listening for some time at the edge of the cliffs and hearing no barking, we came to the conclusion that it was walruses which had disturbed the dogs, and returned to the hut. A few minutes after "Gladys" (a dog I had given to Armitage) was heard barking at the flag-staff, and Heyward came in to tell me that he believed he could hear a bear hissing there. Armitage, Child, and I started out again, and found "Räwing" entertaining a bear by himself. As we approached to within twenty yards he retreated down the slope, and Armitage and I fired, shooting him in the rump, and away he went across the floe towards the open water; we followed him as far as we could, but then came to a place where he had fallen through the ice, and as the barking had ceased I felt sure he had taken to the water and had swum for it. As the ice was evidently thin and covered with a coating of snow, I came to the conclusion that it would be unadvisable to go farther in the darkness and mist. Shortly afterwards "Räwing" returned.

As the mist on the ice was very dense and the ice was unsound, I sent Child for a hurricane-lamp to follow the bear's tracks in the snow, and by the way in which he had avoided hummocks and picked the smoothest road, I am quite convinced that bears can see very well in the dark.

I am always anxious to afford my fellows amusement and give them sport, but doing so is very detrimental to the chances of a kill. I can always do better alone. One man is quite enough, for he can always get up within a few yards—say eight or ten—without alarming the bear, although always likely to be charged by him; but a number is sure to scare him—at all events, scares many, although some are not alarmed at anything that may be done. Armitage, whenever he was out with me last winter, always separated from me, and almost the only bear that I got a shot at and actually missed bagging was the one that "went for" me on February 7th, and escaped, badly wounded, owing to my running out of cartridges. There is no doubt that the three of us approaching the bear to-night, and my having to speak in giving directions, alarmed him, and made him turn tail, and when once a bear turns his hind-quarters towards one in the dark it is all up; for one may fire at his hind-quarters till one is tired of it, and it won't stop him. The betting is about ten to one against a shot fired at more than twelve yards distant being effective in

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the dark, as one cannot distinguish the bear's head plainly farther off, into which it is necessary to put a bullet to make sure of him.

December 15th, Sunday.—Our off day! I went for a walk around the "Row" in the morning, doing my usual three miles and a half. Every one went for a walk either before or after lunch.

After lunch Fisher amused himself by designing and decorating by drawings some menus for our Christmas feast.

The same thick, snowy, dark weather.

An aurora to-day gave sufficient light to cast a faint shadow.

December 17th, Tuesday.—It had been calm for some hours previous to 1.30 A.M., when during my watch I noticed a gentle breeze from the northeast. This increased so rapidly that in twenty minutes it was blowing a moderate gale, and the thermometer fell 6.5° in a few minutes. It went on increasing in force, and it has been blowing at storm force most of the day, and driving the snow before it with great violence. The thermometer fell to 20° F. below zero, and the sky cleared. During yesterday southwest airs and light breezes had been noticed during part of the day. It seemed as if the northeast winds rushed down to meet them and drove them back. I have frequently noticed this before.

Sent every one out for a walk near the house this morning, having first tried the weather myself for an hour and a half. I found that with a face-guard there was nothing unbearable about it. We moved the three sledges off the floe on to the bank by the flag-staff, as I fear the storm may sweep the ice out of the bay. This is the hardest blow we have had since landing here. At times it is difficult to keep on one's feet; the driven snow is very dense, and the cold intense.

Fisher went on with the sketches. The doctor began to skin the two geese I shot last September, ready for our Christmas fare, as they had been reserved for our Yule-tide pot, keeping the skins as specimens. It is one advantage we have here. A goose three months dead is palatable—we don't have to bother with refrigerators!

After dinner the dogs gave an alarm of "bear"! I took my rifle and went out on the floe to investigate, but found them barking in play, and having a bear-hunt drill on their own account.

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I afterwards put in five hours in the observatory, helping Armitage with the unifilar magnetometer, taking observations for deflection and variation. A dark misty day and frequently snowing.

December 20th, Friday.—After breakfast Armitage came in to tell me that "Daisy" was yelping at the top of the talus in the same spot as she was heard yesterday. I put on some ice-spikes, and taking an ice-axe started up in the direction from whence I fancied the barking proceeded. After rather a nasty climb, as the talus rises at an angle of 45° at that point, and is six hundred feet high, the soil as hard as rock and coated with ice, I reached the top to find no signs of the dog and no sound from her, as the barking had ceased soon after I started the ascent. I waited there for nearly half an hour, calling and whistling to her, but got not a whimper in reply.

After a great deal of trouble and considerable risk, as one slip would have sent me to the bottom, where I should have arrived in rather a pulpy condition, I descended, when she again commenced yapping a little to the left of where I had been under the rocks at the top. The tiresome little beast could get down easily enough with her four legs and natural aptitude if she had pluck enough to try, but in the dark it looks like a black pit below, and she gets frightened at the prospect. At all events, it is hardly worth the risk to clamber up there in the darkness again to escort her down—to say nothing of scrubbing one's clothes to rags in the endeavor to stick tight.

December 21st, Saturday.—Thank goodness, it is the shortest day, and now the sun will begin to return to us! or rather wait for it. At 5.30 A.M., during Child's watch, "Nimrod" woke me by barking loudly. Child went outside, and returned in a few minutes to tell me that he could hear a bear hissing on the top of the high bank towards the floe-berg. I hurriedly put on a coat and a pair of breeches over my pajamas, and took my rifle and started off, but soon discovered that the excitement among the dogs was caused by a number of walruses in the open water, and that the hissing heard by Child was a walrus blowing in the distance, which certainly sounds in the darkness like a bear near at hand.

After lunch Blomkvist asked for permission to try a little farther west up the talus to where I ascended yesterday to reach

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the dog, which is still up there, as that way up seems much easier than the one I went. I gave him permission to do so, as he is a good climber and fearless, cautioning him against risking his neck unnecessarily, and gave him a pair of ice-spikes and an ice-axe. He was fortunately able to reach her from that direction, and found the dog in a spot from which she could easily have descended had she tried. He brought her down about thirty yards, and then naturally thought that she would follow him; she however immediately returned to the spot he had just fetched her from, and he had again to go up and bring her down! She appeared to be very much afraid of the steep slope, and her sole idea of movement was to go up, which evidently for a dog as for a man is easier than to descend.

December 24th, Tuesday (Christmas Eve).—Every one went for a walk on the floe in the morning. I find a bear had been round the "Row" since Sunday, and evidently disapproved of the presence or arrangement of our jacks, as he has broken seven of them off about two feet above the ice.

Armitage and Fisher darned their socks, and I inked in my sledge journal, and together with Child helped the doctor with a dog that has to be operated upon. We have all been much bothered with sleeplessness lately: we very easily awaken, and then experience great difficulty in getting to sleep again. The doctor recommends twenty grains of sulphonal, which some of us are going to try to-night. Being Christmas Eve, we had drinks and cigars, reserved for very special occasions, this evening. Every one was very merry. These sort of festivals are very welcome, and make a bright change in the somewhat dreary monotony of our lives.

December 25th, Wednesday (Christmas Day).—Overcast and dark during the morning, but towards the evening the sky cleared a bit and the moon shone out. It was calm, with a temperature of 20° F. below zero.

We all went for a walk either in the morning or during the afternoon. We had our hair cut in honor of the occasion and a change of clothes. Several of us can act as barbers, although some of the heads after being operated on look rather as if they had been nibbled by rats.

The dogs apparently got on to the track of a bear about 2 P.M., but a long way to the westward, as Armitage, who was on the

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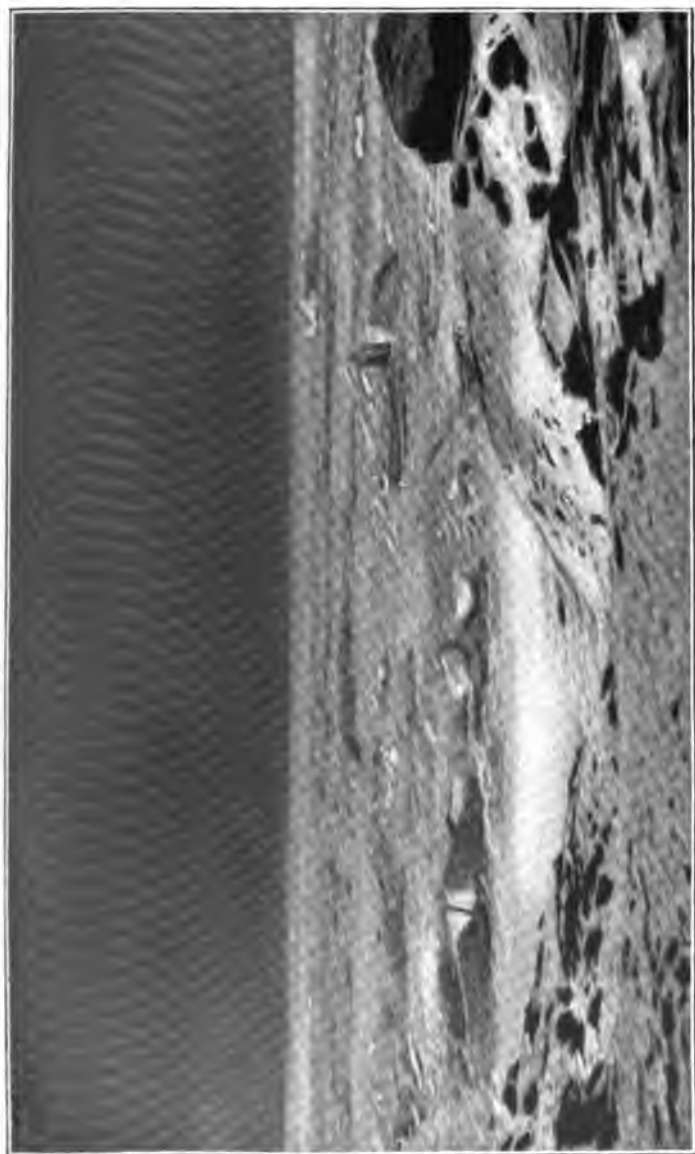
floe at that time, could only just distinguish "Räwing's" deep bark in the distance.

We had dinner at 8.30 P.M., and Heyward succeeded in producing a very *recherché* one. Various good things, in the shape of plums, sherry, and one bottle of our original dozen champagne, had been reserved from last Christmas for this occasion. The champagne, however, had been kept in too cool a spot, and was quite flat! I proposed the health of "Her Majesty the Queen," and remarked that we had added a little to her polar possessions, and trusted that by this time next year we shall have added still more. I then proposed the health of "Mr. and Mrs. Harmsworth, Mr. Montefiore, and all our friends."

Following the honoring of these toasts I proposed the health of Dr. Nansen, Lieutenant Peary, Wellman, and their parties, and wished them good luck.

Armitage then proposed the health of "Our Leader," and made various very complimentary statements in reference to me, saying, among other things, that I "have all the necessary qualities of the leader of an expedition of this kind, mentioning pluck, energy, perseverance, and endurance, and stated that all would agree with his opinion that I only require time and money to achieve the highest point of my ambition—to reach the pole."

In replying to and thanking Armitage and the members of my party for drinking my health, I thanked them all for the way in which they have worked to forward the interests and objects of the expedition. I remarked that we had a nasty splash together off Cape Lofley, and I felt sure that the time we had there and our life together here would serve as a bond of union among us that would exist throughout life, and would always be a source of kindly feeling. I also stated that I am just as hopeful as ever of reaching the pole if the land doesn't fail us, and that I believe nothing but a moving pack will stop us. Heyward was thanked for the good dinner he had provided, and Fisher for the artistic menu cards he had drawn for each person. The evening concluded with songs, liquor, and smokes at 2 A.M., and I think every one much enjoyed himself. I expect our friends have been saying: "Poor devils, they have no Christmas pudding this year." Hadn't they, though! They have no notion what an idea those "poor devils" have of looking after themselves! And what a



"EVEN THIS LIGHT MADE US FEEL AS CHEERFUL AND JOLLY AS SAND-BOYS. LIFE SEEMS TO WEAR QUITE A DIFFERENT ASPECT"

The ice-floes by moonlight

THE NATIONAL ARCHIVES
COLLECTIONS
AND RECORDS
ADMINISTRATION
UNITED STATES GOVERNMENT

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wonderful pudding Heyward produced out of nothing, French prunes, chopped small, taking the place of raisins, and other ingredients being absent. I hope all our friends are as jolly and as fit as we are. I took the meteorological watch from 2 A.M. till 6 A.M., when I called Fisher.

None of our bear-dogs, who are hunting on their own account, except "Räwing" had returned, but we had him in and loaded him up with dog delicacies in honor of the occasion.

December 29th, Sunday.—A treat! A magnificently fine, clear, calm moonlight day, with a temperature of 18° F. below zero.

We all went for a walk in the morning. I walked some distance along the edge of the bay ice near the open water with my rifle. Then returned to the house, and took out two cameras and set them for a time exposure on the floe. After lunch I fixed up the half-plate camera in the wooden screen near "Bear Berg" for time exposures. I find on developing the "landscape" films used yesterday that three hours' exposure is sufficient for ice with F. 11 stop. All the negatives have turned out very well except one, which had been spoiled by movement. A dog had apparently smelt at the camera on the floe and had slightly moved it. I have changed the films several times this afternoon and evening.

After dinner Armitage and I took an observation of a moon-culminating star for longitude. I took my rifle and, accompanied by Fisher and the dogs, went for a walk along the edge of the bay ice near the open water in search of a bear, but without success, and got back to the hut at midnight. The moon gave an extremely brilliant light to-day, due to the clearness of the sky and to the reflection from the snow. I have never in any other part of the world seen such brilliant moonlight. I could almost see the sights on my rifle. Even this light made us feel as cheerful and jolly as sand-boys. Life seems to wear quite a different aspect.

December 3d, Monday.—Armitage, by his last night's observations for moon-culminating star, makes our longitude 49° 44' 37" 65 E. We intend to take as many absolute observations as possible to mean with this and the lunar we took last winter.

We all went for the usual walk this morning. A fresh breeze, driving snow, and a temperature of 23° F. below zero rendered the atmosphere distinctly bracing. The driving snow and slight

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mist prevented my taking further negatives to-day. I developed those taken yesterday after lunch to-day, and they have turned out extremely good.

December 31st, Tuesday (New-Year's Eve).—A fall of temperature to-day to 37.5° F. below zero, and the minimum showing as low as 46° below zero at midnight.

We all went for our usual walk this morning, and the fresh breeze made the cold very apparent. As the sky was clear and a bright full moon shining, I took the cameras out and set them up on the floe for time exposures. I changed the films every three hours, using stop F. 11 and "Rapid" and "Landscape" plates.

The breeze freshened up to a moderate gale at 10 P.M., but at 11.45 P.M., when I fetched the half-plate camera in, had died down to nearly a calm. This is the first time, I should say, that negatives have been taken with the thermometer showing forty below zero by moonlight on the 80th degree.

The ice has been cracking all day, caused by the increase of cold, as have also the timbers of the house, making loud reports. Frost-smoke has been rising in dense black clouds from the open water, which still runs east and west off the land here.

After dinner we made a bowl of milk-punch, and with songs finished up the old year and saw in the new in great form. The old doctor was very happy, and sang us several songs. We fetched in the bear-dogs, present and prospective, and gave them a taste of punch also, so as to complete our polar family circle. Poor "Jinnie" has not turned up, and I fear there is little chance now of her doing so. No doubt the bear killed her. Both my little bitches have gone—the mothers of all the pups and of our future sledge teams. Poor little "Jinnie" was very fond of me, and seemed never happy unless close to my heels or sitting at my feet. She had become a capital bear-dog, and was very keen. I miss her very much, poor little dog.

CHAPTER XXI

A NASTY CLIMB IN THE DARK

January 1, 1896, Wednesday.—Our second New-Year's Day in Franz-Josef Land and my third in succession in the Arctic.

The low temperature still continues, the wind varying between north and east, and the thermometers keeping persistently upon 40° F. below zero. The wind has varied from a light breeze to a moderate gale during this time, and when the wind is at all strong the cold is keenly felt. Strange to say, the sky has been overcast and misty all day. This I believe is one of the few recorded instances of a gale of wind with the temperature anywhere near as low as 40° below zero. I hope this may be an unusual occurrence even in this land of surprises, and that the clerk of the weather won't be playing tricks of this kind when we are out sledging in March. Forty below zero is quite cool enough when camped out, without a gale of wind to rub it in.

We all went for our usual walk to-day with face-guards on.

Heyward got us a very nice dinner—roast pony, plum-pudding without raisins, being the chief dishes, and we finished up the evening very pleasantly. Every one did his best to amuse his neighbor, and one and all laughed at the stalest of the stories as good-humoredly as if he had never heard it before. Six men living in a space 12×13 feet for over eighteen months are apt to spin the same yarn more than once. Minimum thermometer registered 47.5° F. below zero.

January 2d, Thursday.—The thermometers have kept close down upon 40° below zero throughout the day, but there has been less wind than yesterday, and it has been clear and fine.

We all went for our usual walk in the morning and afternoon, and I took the cameras out for time exposures, and tried the telephoto lens upon Bell Island and Cape Gertrude. I have changed the films for fresh exposures about every hour and a

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half for the "Rapid" films and every two hours for the "Landscape," which are slower.

Heyward had been having a great deal of trouble with the bread, and it is terribly heavy. He uses some yeast-cakes in making it. I went into the matter a little and found that by following the printed directions he makes the paste too wet, but that by mixing it as stiff as possible, and by allowing the dough to remain overnight above the stove to rise, fair bread can be made. I find one yeast-cake is sufficient for one baking of a day's bread for us.

Heyward has permission to keep "Charlie"—a rather ill-conditioned cur for which he has a temporary affection—in the kitchen during the severe weather. "Charles" had to be removed from the dog-house, as the other dogs were trying to eat him, and was tied up outside to save his skin. Heyward, in a way peculiar to him, walks all over this dog, and continuous squaaks and howls announce his progress through the kitchen. The dog sometimes tries to escape into the common-room, but Heyward immediately lugs him back, and the squaaks begin afresh. "Charles" is beginning to look dejected.

We are beginning to feel the want of more books and a better selection of them. With Arctic volumes especially we are very badly provided.

January 7th, Tuesday.—All to-day the wind has been blowing with unexampled force, even for this balmy spot. Having this morning veered round from its easterly direction to northwest, it has been blowing in violent gusts even up to force 12 (or hurricane force). The sky has been misty and quite overcast, and the loose snow has been driving fiercely, with a temperature falling as low as 37° below zero at midnight, before which time the gusty character of the storm had settled into a steady storm force (force 11). I watched the Meteorological Office aneroid this afternoon during some of the gusts, and the needle vibrated as much as two-tenths (28.40 to 28.60), rising between the gusts and falling irregularly during them.

All but two went for a little short exercise this morning close to the house. I did not insist upon these two going out, as I considered there were very rational reasons for remaining indoors.

After lunch I went down on to the floe to remove the two

A NASTY CLIMB IN THE DARK

sledges there, as I was afraid of all the land ice being carried away by the wind. Could nowhere find, however, the Russian horse-sledge. As Blomkvist had used it last in exercising the pony, I went back for him to aid me in finding it, and to get the mast-head lamp, as it was extremely dark. The sledge had vanished, and we could only find a few splinters, which tell a tale, I am afraid. When on the ice both Blomkvist and I were blown down, he falling on the top of me, during one of the fiercest gusts.

I afterwards went for a little exercise on the pond by the hut for an hour, lying down on the ice when the strong gusts came along to avoid being blown down. The land-floe, when Blomkvist and I were down there, was creaking ominously, and cracks were forming in every direction. I could dimly see the open water quite close, and nothing but the small grounded bergs evidently were keeping the ice in the bay.

Blomkvist and I afterwards went on to the roof of the stable, holding on tightly all the time, to secure the sledges up there, as they were beginning to come adrift; we also nailed up the door of No. 4 hut with some boarding, as it is threatening to go. How these canvas houses have stood is a wonder to me. Nothing but the fact of their being frozen hard down, and being full of heavy stores, in my opinion, has saved them.

I fetched our two bear-dogs (the only two now remaining), "Räwing" and "Nimrod," and the little bitch "Gladys," which I gave to Armitage to console him for "Sammie's" loss, into the hut, where I shall keep them until the severity of the weather decreases. At present it isn't fit for an Arctic devil to be out in! After lunch Armitage wrote up the observations, Fisher went on with a sketch, Child finished the paraffin-stove, and the doctor worked at a specimen (bird).

Just before the gale began two dogs, "Daisy" and "Pongo," were heard yapping at the top of the talus, having gone up and are afraid to venture down. Their barking attracted the young pups which had just been let out of the stable, and they joined them before they could be stopped. It is a dreadful nuisance! They are, I am afraid, having a bad time, but we certainly cannot make an attempt to get them down until the weather is better.

January 8th, Wednesday.—The storm has been blowing all day a full gale (force 10), with fierce gusts in the afternoon of force

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11. Overcast and very misty, with thickly driving snow. The temperature has kept at about 35° below zero throughout the day. The direction of the wind has been N.W. or N.N.W.

I have kept all the dogs that have had their liberty outside the dog-house inside our hut to-day, and we have had a pretty full house, what with men and dogs.

No one cared about venturing out for the usual exercise, and I did not press the point, as the weather is truly diabolical. I went out, however, for an hour's walk on the pond, going backward and forward with a face-guard on, and so got a mouthful of fresh air—very fresh indeed it was, too! Our common-room smells a little "doggy," and what with men, dogs, bear's-blubber, and paraffin, the atmosphere is not as nice as it might be; however, this condition of things will soon be altered when the gale moderates.

January 10th, Friday.—The severe weather still continues. The wind, generally very variable in direction, blowing from a moderate to a fresh gale, with fierce gusts up to force 10. The temperature keeps in the neighborhood of 37° F. below zero most of the day. None of the others cared about facing such weather for exercise. I went for my usual walk after lunch, but reduced it to an hour's tramp up and down on the pond. In the evening they all played whist.

At 11 P.M. the doctor went outside the hut for a moment, and returned joyfully reporting that the gale was over; and Child came in a moment after and told me he could hear a dog yapping at the top of the talus still. As I did not wish to lose a moment after the weather rendered it possible to attempt a rescue of the poor beasts, I called Blomkvist, as being the best and pluckiest climber, to come with me and try if we could get them down.

We had not gone a hundred yards from the hut before the wind got up again, blowing a strong wind from the northwest, bringing a thick mist with it; and as the temperature had fallen to 39° below zero, the cold fairly blew through us. Still I did not wish to turn back after starting, so on we went.

By the means of our ice-spikes and ice-axes we managed, after a two hours' climb, to get above the lower tier of rocks, a height of 600 feet, by cutting steps in the hard, icy snow. The darkness, thick mist, and an incline of about 45° , to say nothing of the cold and wind, rendered our climb extremely nasty, as one

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slip meant a smash to the bottom. And I could not help feeling that I was a fool to have taken on the risk for the sake of a dog, or possibly two dogs, and especially for allowing Blomkvist to risk himself also; but the piteous yelps led us on. We soon found that the wretched animals had chosen about the worst spot on the cape they could find on which to perch themselves, which was up an iced gully running through the rocks towards the ice-cap on the summit, which is 1400 feet above the sea. There at the top of this gully we could tell by their howls they sat. As we got towards the top a second dog began to yelp, so that two out of the five were still alive. The smaller pups were doubtless dead, either from exposure or being devoured by their larger companions. When about sixty feet from the very top we found that it was utterly impossible to go a foot higher. Even the hard snow ceased, and hard compact ice took its place, and the incline increased to an angle of about 60°. Our ice-spikes would not penetrate, and with our ice-axes we could in the darkness only knock irregular splinters out, making very uncertain steps. It meant a tolerably certain fall if we tried to go a foot higher. How the dogs got there at all is a mystery, and I can only conclude that there was a layer then of soft snow which gave foothold, and which the gale has blown away since. There may be an easier way up, which the mist and darkness prevented us seeing.

Very reluctantly we began to descend, a more difficult matter by far than ascending, and which took us nearly three hours during that winter's night to accomplish. We felt like flies on a window-pane, and below us was one black abyss, which a slip would hurl us into. Blomkvist got his right hand badly frozen at the fingers, and also his nose and cheek. I got both feet severely frost-bitten, and also my right hand. My feet got caught, I think, owing to the tight straps which held the ice-spikes on checking circulation, and also doubtless the steel plate of the latter helped to communicate the cold.

My right hand was touched up from grasping the steel of the ice-axe, even through two pairs of thick fur mits.

I walked about outside the hut for a long time on finding my feet frozen, to get them thawed out somewhat before coming into the warmth. They were mightily unpleasant when the thawing process began, and I could not turn into my blankets

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until after 6 A.M., owing to the pain. The doctor, when he turned out for his watch, put some bandages on steeped in lead and opium lotion, which helped to ease them. Fortunately, my circulation and vitality are good, or the consequences would have been serious.

Blomkvist came off better than I did, and his hand soon ceased to pain him. The cold at the hut was 39° below zero, and doubtless at an altitude of at least six hundred feet higher it was somewhat more; and together with the strong wind and our necessarily slow movements, it is hardly surprising that frost-bites did occur. I wish we could have got the dogs, though!

January 12th, Sunday.—I took a double watch during the night from 10 P.M. of January 11th to 4 A.M. of the morning following as Fisher does not look well, and I think an undisturbed night's sleep will do him good.

Both the bear-dogs and "Charlie" and "Gladys" have been inmates of the house night and day during the very severe weather. To-day they have been turned out to attend to their regular vocations of looking for bears.

This evening, at 11 P.M., a whine was heard outside the hut and on Fisher going out to ascertain what dog it belonged to. I found, to our surprise and relief, that "Daisy" and "Pongo" had at last mustered up courage and had come down from their perch at the top of the talus. If they had once attempted to do so they could not fail to come, as they would slide down pretty smartly the greater part of the way *nolens volens*.

They look very thin and weak, but very lively, and ate ravenously of some tinned beef which I gave them. I only portioned out about one pound each to start with, although I believe they would have eaten ten times the quantity; but reserved further feeding for an hour or two.

This is the tenth day they have been without food and exposed to some of the most fiendish weather, I should say, on record. They are two Samoyad pups from "Jinnie's" litter, and under a year old. The vitality of these northern dogs appears to be marvellous.

Every one has been complaining of shortness of breath since the winter began. I noticed the same thing last winter myself. I conclude that the cold air causes a constriction or spasm of the larynx. I find that in chasing a bear I cannot run far without

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slackening down my pace. I don't think I am in the least anæmic, which would account for it.

To-day I have three large blisters on three of my toes on my right foot, and the left appears likely to follow their lead, as the result of frost-bites. The lost sledge has been found driven half-way up the very steep slope of a berg, and had apparently run up and down it as the gusts came and passed. It is much damaged, but can be repaired.

January 13th, Monday.—The weather has been an improvement on what we have experienced recently. The wind, chiefly northeast, has varied from calm to a strong breeze; and the temperature has generally been standing at 40° below zero, with the mercury frozen, as it has almost constantly been for the last fortnight.

We find it difficult to tell by looking at a mercurial thermometer whether it is frozen or not when the cold is in the neighborhood of its freezing-point. I instructed Armitage to place a small quantity of mercury in two phials in the thermometer screen, to enable us at once to see in what condition the thermometers are. At midnight the temperature had risen by the large mercurial thermometer to 36° below zero, and by the Meteorological Office spirit thermometer to $38\frac{1}{2}^{\circ}$ below zero, having at 10 P.M. registered respectively 39° and 40° . In one phial the mercury was quite solid, and in the other a bead of liquid mercury ran from the solid mass.

At 1.30 A.M. "Daisy" gave birth to three pups, one being dead. This birth is premature, and caused probably by her late hardships and by her slide down the talus last night.

January 14th, Tuesday.—All went for the usual walk to-day. A definite light is now perceptible at noon from the returning sun.

After lunch Armitage wrote up observations, and I helped him to take a stellar observation for time, as the weather was calm and clear.

One of "Daisy's" pups died last night, and as she has no milk, Child has become the foster-mother of the remaining one and is trying to feed it.

January 15th, Wednesday.—The wind to-day has been from a calm to a gentle breeze (chiefly northeasterly), and the temperature about 32° below zero.

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A little before 8 A.M. I was awakened by "Nimrod" in his language yelling "Bear!"

Heyward and Armitage, who had just turned out, came in to tell me that "Räwing" was barking on the floe, so I had "Nimrod" slipped to give him a hand. Armitage and I started off in a few minutes with our rifles across the rough ice opposite the tide-pole, after I had slipped on a coat and breeches over my pajamas. We, however, soon found that the bear, which was roaring loudly and evidently much annoyed, was out of reach on the thin bay ice beyond the old floe, and which was in much too unsafe a condition, having only been frozen since yesterday for us to venture upon in the darkness. We tried to call the dogs off, but failing, and getting half-frozen waiting about, we returned to the hut. I did not think there was a hundred to one chance of our getting a shot at the bear, but before I turned into my blankets again (I had been up till 3 A.M.) I told Blomkvist and Heyward to keep a look-out, for it was evident that it was much enraged, and I considered it possible that it might give chase to the dogs, which, in beating a retreat, would lead it towards the hut. An hour or so afterwards Heyward came to tell me that two bears were on the floe close to the slope by No. 1 hut, with the dogs entertaining them. I hurriedly rushed into a coat and breeches, and, accompanied by Armitage, started off to find the bears among some hummocky ice about three hundred yards on the floe to the south, engaged in making rushes at the two dogs and roaring loudly. We got round them to cut off their retreat to the water, and on approaching to within about ten yards we opened fire. I knocked over the mother and Armitage in fine form bowled over a cub about half-grown which tried to make a dash for it. We were examining the latter, when suddenly another half-grown cub appeared, which I promptly shot through the head—making a bag of three bears. We then returned jubilantly to the hut and got a sledge, and the whole party lent a hand to drag them to the foot of the ice slope of the cliff, up which we hauled them. Before removing them from the ice Child and I photographed them on the spot they were killed, with a magnesium light, as an experiment. I had one cub dragged into the hut and weighed. It scaled 234 lbs. (16 stone 10 lbs.).

The doctor, Armitage, Blomkvist, and I spent the rest of the

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day until after midnight in skinning and cutting up the bears in No. 2 hut. The cubs, big as they were, were still sucking the mother, and all three were in fair condition. In the stomachs were the remains of semi-digested seal, and in addition, in the mother's, two small scraps of printed paper, evidently Norwegian or a similar language.

As we could not in any way account for this, we were all inclined to think that the bear had picked it up in the neighborhood of some Norwegian ship up in these parts, and our thoughts



A KILL.

naturally turned to Nansen ; and speculation was rife. We were talking of the warm welcome we would give him if by some wonderful chance the *Fram* should drift into our neighborhood. At last, however, Heyward identified one of the small scraps of paper as being identical with a portion of a label on our Danish butter-tins—about the only piece of printing resembling Norwegian we have here, I think. How the old lady came by it I cannot say, but it is remarkable that her selection should have been what it was ; especially the one portion of the label she did choose, which particularly tended to perplex us.

We had a glass of port each after we finished the skinning to

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celebrate such a red-letter day. The two bear-dogs, "Nimrod" and "Räwing," were fetched into the hut and treated to luxuries. The former had had a near shave in the hunt and got his front paw badly bitten. He is now limping about with it bandaged up, and quite looks his part of the wounded hero. They did wonderfully well to tackle three bears at once so successfully.

January 16th, Thursday.—Blowing from southeast by east, with thick snow, increasing in force to a strong gale; very unpleasant.

We all went for our usual walk. After lunch the doctor, Blomkvist, and I started upon the bears to remove the blubber in No. 2 hut. By dinner-time they had become so hard frozen that we had to cease work and bring the skins back into the hut to thaw out by the stove during the night.

Most of us have a slight touch of cold in the head, with sneezing, to-night, the first I think since arriving here. Heyward a day or two ago opened some fearfully evil-smelling tinned beef-steak which made the house uninhabitable for hours with its awful odors, and spattered himself all over with it. The proximity of Heyward is avoided just now. The doctor has a theory that the influenza germs may have arisen from the putrid meat germs. Our affection, however, only lasted an hour or two.

January 17th, Friday.—Between 10 P.M. of January 16th and 2 A.M. of to-day, the thermometer rose 17° , with a strong gale from the east and snow, rising from 19° to 2° below zero, and the maximum marked as high as $+6^{\circ}$. This indicates, I conclude, a considerable extent of open water out in that direction, causing a wave of warm air.

During Fisher's watch, about 5 A.M., I was awakened by "Nimrod" frantically barking, and as I supposed that there was a bear near I turned out, but soon found that the cause of the disturbance was a row between "Räwing," "Charlie," and "Pongo," and that "Nimrod" was applauding the combatants.

About 10 A.M. I was again aroused by Heyward coming to tell me that there was a large bear by No. 4 hut. I put a coat over my pajamas and started out in my slippers, followed by Armitage and Blomkvist. Found "Mr. Bear" behind the stable standing at bay, with "Nimrod," who had been slipped, and "Räwing" barking around him. I went up to within eight yards of him and killed him with one shot through the head from my .450 express rifle. We were making preparations to photograph the bear



"I WENT UP TO WITHIN EIGHT YARDS OF HIM AND KILLED HIM WITH ONE SHOT."

Photographed by magnesium ribbon

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where he lay with the magnesium light, when "Räwing" was heard barking upon the floe, we concluded at another bear, and "Nimrod" was slipped again to help him. Armitage and I started off, and I gave Heyward and Child permission to come too, as I did not care very much whether we got this one or not, having meat in the larder and four skins to clean on our hands already. I sent them out east and west to approach the bear from opposite directions. Child, however, wandered off west somewhere in the direction of Mabel Island, and placed himself unfortunately completely out of the running; Heyward I discovered cruising about over some thin bay ice in blissful ignorance that it was far too weak to venture upon with safety. After going about a mile we found the two dogs barking at a walrus on the ice, and as we could not approach it, owing to the ice there having been frozen only a few hours and too thin to bear us, we tried to call the dogs off and returned to our photography. We then sledged the bear into No. 2 hut, where we again photographed him, as he was a huge beast. It gave us a great deal of trouble to move him about.

I was occupied till midnight skinning him, Fisher holding a light for me. The doctor and Blomkvist went on getting the blubber off the skin of one of the cubs shot on Wednesday. After leaving off work we removed all the skins to the hut to prevent their being frozen during the night. Bear-skins and blubber are rather odoriferous companions, and do not add to the attractions of our quarters.

The bear measured on the body: Length along belly, 7 ft. 11½ in.; length along back, 8 ft. 2 in.; girth of chest, 6 ft. 5½ in.; girth of belly, 6 ft. 7¼ in.; weight of brain, 15 oz.

He was fairly fat, and has evidently been able to get plenty of food during the winter. The remains of a seal were found in his stomach.

A very fine aurora occurred at 8 P.M. W.S.W., shooting out thick bands and streamers across the sky to E.N.E., with fringes of bright green to deep rose, recurring, scintillating, and darting rapidly. A corona in the zenith. It started at about 6° above the horizon. The colors were more intense than any we have yet seen and it gave far more light, brightening up the whole country to the horizon.

Magnet V of the magnetometer vibrated considerably and

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rapidly. The deep rose tint at the edge of the streamers often became changed into a purple. Nearly the whole aurora would occasionally disappear, and then in a few minutes reappear with great brilliancy. It lasted about an hour.

The aurora borealis vibrates over the vast cupola of the heavens in ever-changing colors, rapidly altering in tint from yellow to green, rose, and purple. Now it opens out and again contracts in endless change, breaking into serpentine bands, which fold up, and again unfold, and dart rapidly from the horizon to the zenith, lighting up the whole landscape with its soft rays.

The whole sky is a blaze of glory, when suddenly these spirit-fires fade away and only a few faintly luminous tracks of its former magnificence remain. In a few moments its scintillating streamers flash forth again, and the kaleidoscopic maze of light is repeated, yet ever different. Not a sound is heard, and all is breathless stillness as this mystic dance of departed spirits continues.*

January 21st, Tuesday.—All went for the usual walk this morning. The doctor and Blomkvist finished the fourth bear-skin and had salted it down by dinner-time. On comparing the weights of the brains of the bears recently shot, I find that the huge he-bear shot on January 17th is three ounces short of a similar but somewhat smaller bear shot on December 7th; two ounces short of the she-bear shot on January 15th; and one and a quarter ounces short of No. 2 cub killed at the same date. He must have been a bit of an idiot!

After lunch Armitage wrote up the meteorological observations. Child finished making the second rib of the tent. Fisher was engaged in making a woollen mask for his face for high wind and low temperature. I partly cleared out my "room" (size about 7 × 4 feet, chiefly filled with guns and books), which is in a fearfully damp condition from condensation, and wiped and dried the walls and a number of articles. There is a perfect glacier of ice formed on the outside wall.

Armitage, the doctor, Fisher, and Child played whist after dinner.

January 23d, Thursday.—A fresh to strong easterly gale has

* The Esquimaux believe the aurora borealis to be the souls of their departed at play.



" WHERE WE AGAIN PHOTOGRAPHED HIM, AS HE WAS A HUGE BEAST "

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been blowing all day with very thick snow falling and driving. Part of the time it fell and drove thicker than at any time this winter or autumn, and when standing at the edge of the pond fifteen yards from the hut, the hut itself and even the lighted-up windows were perfectly invisible. All went for a short walk before lunch in spite of the weather.

After lunch Armitage wrote up the observations. Child started to repair my .450 rifle, as the stock has given where he glued it some time ago. The doctor repaired his boots. Fisher mounted the traced map upon linen. He is very neat in all he does. I did some odd jobs and then washed some clothes, getting level again with them.

Blomkvist looks rather pale and thin and has lost his appetite. The doctor gave him some morphia this morning and some sulphonal to-night to induce sleep. I feel a bit anxious about him.

January 24th, Friday.—The barometers are now very low, and at 10 P.M. the Meteorological Office aneroid registered as low as 28.34. The George's showed 28.22 and the marine barometer 28.512. The wind has been variable both in direction and force; at 1 P.M. it was blowing a strong gale from north-northeast, and at 4 P.M. a fresh wind with fierce gusts from north-northwest at force 10 to 11, with driving snow. We all went for the usual morning exercise.

January 27th, Monday.—Blowing hard all day; occasionally steady with a force varying from a full gale to a storm, at other times in fierce continuous gusts up to storm force and occasionally approaching in violence that of a hurricane. Overcast and misty most of the day with a temperature 25° below zero.

The violence of the wind worked adrift the sledges that had been lashed down to the roof of the stable and smashed one in half (fortunately this was a sprung 13 ft. sledge). Before further damage was done the rest were removed to the enclosure.

Part of the wall, consisting of dog-biscuit casks with cases of spirit on the top of them, which had firmly withstood all previous gales both this year and last, was blown down, as was also the wall of tinned meat cases between the hut and the stable.

All went for the usual walk about noon, with faces well protected, when it moderated for a time to a fresh gale. I, however, took my exercise later in the day, between 4 and 6 P.M., when I had the greatest difficulty in keeping my feet at all, and once on

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the pond was blown down by a fierce gust and driven along on the ice for five or six yards. Waigatz Island and the Yugor Straits country are reported to be very stormy during the winter. I can quite believe it if they get even the fag end of our north or northwest gales.

After lunch Armitage wrote up the meteorological observations, Fisher washed some clothes for himself, Child went on with the tent. The doctor stopped a tooth for me which is showing signs of going; also one for Armitage and another for Fisher. He has also been overhauling the dogs' harness. "Räwing" gnawed a large hole in our outer door with the object of making comfortable lodgings for himself inside our hut. As this is the third door he has similarly treated, his enterprise was to-day rewarded with a tanning to deter him from further destructiveness. He looked at me afterwards as if he thought me a very odd person, but regretted that my eccentricity should take such an unpleasant form. He didn't care twopence for it.

The barometers have been rising steadily during the last three days in spite of the delightful weather we have been enjoying. The aneroid (Meteorological Office) vibrated four-tenths this afternoon during the gusts.

January 28th, Tuesday.—A great improvement in the weather to-day, the wind having gone down in strength, varying from light breezes to a strong wind, variable in direction but chiefly northwesterly. It has been overcast and misty a great part of the day. Fine weather seems reluctant to come to us, however, and the barometers are falling again to-night.

A very large expanse of open water was visible at noon to-day, and no ice could be seen beyond the land floe, either south, south-east, southwest, or west; the tide, however, brought up ice with it from these directions towards midnight. It certainly looks as if it would be possible to navigate a ship to the south even at this time of the year. There was a bright orange glow to the south at noon. All hands were set to build up the walls blown down during the last gale, and then every one went for the usual walk.

"Gladys" gave birth to five pups this morning. This will be a great help, and will replace some of the murdered ones.

January 29th, Wednesday.—Between 6 and 8 P.M. long arched lines of cirro-stratus clouds extended over the zenith, focussing

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at S.S.E. and N.N.W. A similar occurrence happened on March 23, 1895. The weather continued fair and clear, with N.N.W. breezes chiefly until 10 P.M., when the wind became easterly and the sky overcast.

"Räwing" went with me for a walk, and when out found a he-walrus lying on the ice beyond "Bear Berg." His barking brought me up to the spot, and taking a seat on a hummock, I watched the performance between the walrus and the dog at about six yards distance. The walrus lay apparently insensible to the dog's presence for a time, and appeared to treat him with severe contempt, although "Räwing" was shouting his loudest within three feet of its nose; when suddenly raising himself, as if exasperated at the dog's noise and impudence, he would make one or two vicious digs at him with his tusks—which the dog easily dodged and seemed to think great fun—and then lapsed again into apparent indifference. This went on for fifteen or twenty minutes, when, as I was getting cool and seeing no variety in the entertainment, I called the dog off. My calls evidently alarmed the walrus, and he quietly slid tail foremost into his hole—as quietly as an alligator takes the water—and disappeared. Walruses, as a rule, but not always, lie with their back flippers over the edge of their hole, into which they slide backward on taking alarm.

He did not mind in the least the dog's vehement barking, but directly he heard a human voice he became alarmed.

January 31st, Friday.—The easterly winds still continue blowing from a moderate to a fresh breeze most of the day, and early this morning the temperature began to fall and it stands 21° below zero to-night, indicating that most of the sea east of us is probably filled up with ice. No open water anywhere can now be seen.

After lunch Armitage, at my request, made out a list of the prevailing winds and forces during last summer and autumn; as they (north-northwest and northwest and west) no doubt had very much to do with the western portion of the Barents Sea being so free of ice up to August 12th; and probably contrary winds beginning to blow at the beginning of August had much to do with this portion of the sea being filled up with ice after the first fortnight of August. I have asked Armitage to get out statistics for me to see if my opinion is backed by fig-

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ures. I have not yet had time to classify the figures he has given me.

Fisher made botanical notes from various appendices; the doctor washed his clothes; Child did several odd jobs. I made a list of provisions and equipments, with weights, required for our spring sledging.

About 6 P.M. Blomkvist came in to tell me that "Rags" and "Pincher" had contrived to get at "Punch" in the dog-house, and had badly wounded him. I went out and examined him, and carried him into the hut, where we found he had a wound in the abdomen showing a broken floating-rib, with a part of the liver protruding through it and outside the wound.

The doctor sewed it up and I gave him an injection of alcohol, as the dog was suffering much from shock. Later on he had two injections of one-fourth of a grain of morphia sulphate, as he seemed in much pain. He then went off to sleep. He may possibly get well, although the doctor says a human being could not. He is lodged in the hut until he either dies or has recovered.

February 1st, Saturday.—Poor "Punch" died during the early morning.

Overcast and misty all day, with E.S.E. and easterly winds increasing in force—with a rapidly falling barometer—to a moderate gale towards midnight, with falling and driving snow.

All went for the usual walk.

After lunch Armitage got out a further table, at my request, of the wind and wind forces and directions for last summer. I think when I have got these fully arranged it will enable me to judge of the probable state of the sea to the east or west of us another year by comparing a synopsis of that year or summer with the one drawn out.

At 7.20 P.M. barking was heard outside the hut, and suspecting a bear, Armitage and I took our rifles and away we went. It was very dark indeed, being quite overcast, very misty, and snow falling, and snow was also driving before a fresh breeze. Near No. 1 hut we found "Räwing" barking at a bear that was springing about after him and making rushes. We approached within five yards of him before we could quite make out whether he was a cow, a donkey, or a bear, it was so dark, and even at so short a distance I could not make out his head distinctly. At this range we both fired, looking first of all to see that the dog was out of

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the line of fire, as we always do, and the bear rolled over, but in about five seconds recovered himself and made off towards the floe. I abstained from giving him the contents of the left-hand barrel of my rifle, as I could not make out "Räwing's" whereabouts, and was fearful of shooting the dog. Missing his barking, I looked around, and then discovered that a sad accident had occurred, a bullet from either mine or Armitage's rifle having passed through the bear and struck the poor dog in the chest, and he lay writhing on the ground. Armitage was using the .303 government rifle and I my double-barrelled .450 express. The nature and small size of the wound makes us think that it has been inflicted by the small .303 bullet ; still, if it is so, no one is in any way to blame, and it is a wonder that such an accident has not occurred before, with dogs springing and dodging around in the dark, and using rifles of such tremendous penetrative power as the Lee-Metford.

I picked the poor old chap up and carried him into the hut, and did not trouble any more about the bear, and the doctor, under chloroform, endeavored to trace the course and, if possible, extract the bullet. The passage is so small, however, that we can only ascertain that it has apparently gone into the cavity of the chest, although there is no bleeding whatever at the mouth or nose, or any other symptoms to indicate that the heart or lungs are injured. He appears to be suffering from a certain amount of shock, but it does not strike me as being excessive. There is no doubt whatever of the bullet being a spent one through passing through the bear's body, for at that near range either of our rifles would have put a bullet through the bodies of three or four dogs ; and in the case of "Räwing" the bullet has only penetrated a few inches, as there is no exit wound. It has splintered the thin part of the scapula, but has met with no hard bone. He lost very little blood. We bandaged him up, and as the poor old boy seemed in much pain we gave him an injection, first of one-eighth and followed with one-fourth of a grain of morphia sulphate, as the first did not quiet him sufficiently. He has now been sleeping for five hours, and is breathing quietly and regularly. I have hopes that he may recover. He is a fine, plucky bear-dog, and it would be very sad if he should end his life in such a manner. He has given us many a good hunt, and is a good servant to us.

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Armitage has exchanged his Tweedie bulleted cartridges for some soft-nosed ones, which are less likely to go right through a bear's body. I, too, shall use expanding bullets to reduce the risk of similar accidents in future. I fear it is a case of locking the stable-door after the horse has gone. I went out at midnight to see if the bear is lying at the foot of the steep slope on the edge of the floe, but the gale put the lamp out, and the falling and driving snow and darkness rendered it impossible to see anything. I had previously sent Child with my rifle a few minutes after I fired the shot to look for him there while I attended to "Räwing," but he could see no signs of him, so I conclude he has got away, but he must be very badly wounded.*

February 2d, Sunday.—The gale blew hard (force 8 to 9) all morning up to noon, with dense mist and thick snow from E. S.E. and east by south. It then fell to a fresh breeze, and became variable in direction with mist and snow. "Räwing" is apparently going on well, and the doctor has come to the conclusion that the bullet has not entered the chest, as he shows no symptoms of this having happened. He advises cutting down upon the scapula, which has a small round hole in it through which the bullet has passed, and endeavor to extract it. This we did under chloroform after dinner, but find that it has apparently either passed forward to underneath the chest muscles, or has entered the anterior mediastinum through the costal cartilages. We can feel no broken rib. It is probably lodged under the muscles in front of the vertebræ. Nothing further can be done in the way of exploring for it, as the passage is so small that the bullet cannot be felt, and its whereabouts can only be surmised. It will either cause an abscess which will point out its location or become encysted, when it will give no further trouble. The doctor thinks "Räwing" will probably recover. He removed several pieces of bone (splinters of the hole in the scapula) and hair from the wound, and put in a drainage tube. He gave him an injection of morphia after the operation, as he seemed uneasy and is now sleeping quietly.

* This bear was found at the bottom of the steep slope on May 25 (three and a half months later), when the snow melted, a few yards from where I had fired at him. He had been snowed under in a few minutes.

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dark time has had an ill effect upon all more or less. I keep pretty fit, but get occasional mild attacks of biliousness, due no doubt to the dormouse kind of life we must necessarily lead during the winter. Irritability is occasionally noticeable for a short time, but is well kept under. Our doctor can offer no explanation as to how the long darkness produces sleeplessness, or why it should be more pronounced this winter than last.

February 8th, Saturday.—I am having loom and pony meat fried in lard to take sledging. I find it loses about 45 per cent. of its weight even after the addition of fat. It will save fuel when out, and time and trouble in cooking. We all cut up the meat into small pieces suitable for frying and put them into the observatory to freeze afterwards.

After dinner Armitage and I took star observations for time, to get a good rate for the two watches we intend to use sledging. The doctor is carrying one about with him to give it a travelling rate, as it has been lying in the chronometer-case all the winter.

February 11th, Tuesday.—A fox was seen moving about on the floe about three-quarters of a mile off, near "Bear Berg." Even through the telescope he appeared very dark in color all over his body, nothing about him approaching white, the usual winter coat of the Arctic fox.

I sent Armitage and Blomkvist out with shot-guns to try and cut him off, but with the usual wariness he doubled off east, and probably made for Cape Gertrude. I shall try and construct a flat trap of blocks of ice to-morrow to catch him, as I think it is "Ry" doubtful if we ever shall get within shot of him.

We took out a team of dogs in a sledge round the "Row" for a m exercise before lunch. All went the usual walk. After lunch Armitage wrote up the observations, Fisher cut up bear-meat for sledging, Child went on with the tent. The doctor made a

The nknet coat for "Carlo" to wear sledging. I finished the bear's and t ws.

I examined a large berg to-day just off Flagstaff Point, and embticed that one surface is cut into deep parallel ridges, all running in the same direction, throughout its whole extent. These postelges are about three feet deep. I conclude that this was once little et of the surface of the glacier down which streams of water structured in the summer for several years. It is, however, difficult room account for their running so exactly parallel with each other,

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without once meeting. It looks as if some huge plough had scored the surface, with great precision and regularity.

February 13th, Thursday.—Armitage and the doctor took a shovel and made a place in the snow near Castle Rock to hide in, and I intend to try and get a fox by using our "burgie" as a decoy to bring him within gunshot. Armitage and I walked out to "Bear Berg" and climbed up it. We there saw "Nimrod," who had escaped from Fisher, walrus-hunting on the bay ice. After a good deal of trouble we got him away, but when near the hut our attention was for a moment taken away and he rushed off again, and at midnight he had not returned. As the spring tides, aided by a northerly breeze, moved the bay ice off from the edge of the land floe about 7 P.M., he is now probably cut off by open water. He may, however, get back if the returning tide brings back the ice. The worst of both the Samoyad and Ostiak dogs is that they are very intractable and difficult to teach anything, due I suppose to deficiency of brains, being little removed from the wolf. They can stand very great privations, but they are stupid and intractable. They pay no attention whatever to being called, unless they think you are within striking distance of them, which looks like their being more knaves than fools. Correction they forget ten minutes afterwards, and in many cases appear unable to understand what it is administered for.

All the expedition went out with two dog-teams after breakfast. I am trying to teach the dogs to follow the sledge in front, instead of a man leading; for when sledging in March there will only be three of us, and I think two teams of eight dogs each will do more work than one team of sixteen dogs. They shaped fairly well to-day, and with further practice will, I think, work all right.

February 15th, Saturday.—Sleeplessness causes more or less trouble to every one, and the doctor is affected more than any one, and looks very unwell as the result. The night-watches for taking meteorological observations have, in conjunction with insomnia, proved rather a hardship, as some of the party frequently are unable to get to sleep before they are called to take their night-watches, and after turning in again have remained awake all night. The little sulphonal that came has proved very useful in inducing sleep. I wish we had more of it. The immediate cause of this sleeplessness is over-activity of the brain—

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the thoughts rapidly fly from one subject to another in spite of efforts to check them. This may go on for hours, until at last the will gradually overcomes it, and one sinks into an uneasy slumber from which the smallest noise awakens. I, for my part, have never been troubled with sleeplessness in my life before, but could always sleep like a rock.

February 19th, Wednesday.—We took out the pony and sledge with the dog-teams to practice them together, and used spirit-cases to weigh the sledges. I mean to try one team of sixteen dogs, instead of dividing them, to-morrow, if the day is fine, to see if they will pull the same weight as the two teams of eight each. I find that in rough ice it is unsafe to fasten the central trace of the dog-team behind to the horse-sledge in front, as the pony and dogs won't pull in unison, and they (the dogs) won't follow at all without it. I am afraid the dog-teams will require more than two men to manage them well, but I cannot carry food, etc., for another man, and I must try and get the sixteen dogs to work together in one team.

February 23d, Sunday.—The sun rose to-day, and the long polar night is at an end at last, which every one is very glad of. How we welcome the light! To-day, however, the sky was overcast, and we did not actually see the return of our friend. The wind and tide had cleared off all the ice during the night, which recently had been driven in, and there is now open water again running east and west off the old land floe.

All went for the usual walk at noon to-day. I have been working all day at the preparations for sledging, cutting up bacon into slices to freeze, and weighing out food, etc. I let the others amuse themselves in any way they thought proper. They played whist after dinner—a very favorite evening amusement.

February 24th, Monday.—It being comparatively fine in the morning, and no snow driving, I took advantage of it to set Armitage, Fisher, the doctor, and Child to turn out and rearrange No. 1 canvas hut, which had got into a state of confusion. I cleared out the observatory, swept out the snow which had driven in through small chinks, and went through the sledging provisions, which I am keeping in there.

The others, after finishing No. 1, went for a walk east. I walked out on the floe to the edge of the open water. Saw many walruses playing about and two dovekies (the first birds of any

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kind seen this year). They were not quite white, although in winter plumage; had white marking around the neck and other parts of the body, but were too far distant for me to make out distinctly. I went back to the hut for a gun, as I wished to obtain them as specimens, and gave directions to Blomkvist, Armitage, and the doctor to follow me with the twelve-foot Norwegian boat. On my return to the floe edge, however, they had cleared out, although I saw one of them flying at a distance.

After lunch Armitage went on preparing his gear for sledging, the doctor went on with the boat, Child worked at the tent, Fisher cut up bear's-meat; I weighed out and packed provisions, and went on with the preparations for sledging. About 4 P.M. the wind got into the E.S.E. and afterwards into the southeast, with mist and snow, and by 10 P.M. it was blowing a gale.

February 25th, Tuesday.—After breakfast Fisher, Armitage and Child dug the sledges out of the drift in the enclosure, and placed the broken or damaged ones on the top of the stable and lashed them down.

At noon all the party, except the doctor and I, went for a walk east. I dug the twelve-foot boat out of the drift, and placed it near the hut and covered it in. Tremendous drifts have formed during the night, far worse than any before this winter. We saw the sun for the first time this morning, as the horizon to the south was fairly clear of clouds. All the water space of yesterday is now filled with broken-up light ice, chiefly bay ice. It looks as if there is very little ice to the south of us, judging by the rapidity with which all the ice disappears out of sight with an off-shore wind, and then with a southeast wind or the incoming tide returns. The wind has been chiefly northeast to-day, from 1 to 4 in force, and the temperature as high as $+22^{\circ}$ —very unsatisfactory for sledging, as this is far too warm. A great part of the day it has been overcast and misty.

February 26th, Wednesday.—Heyward last night trod upon a portion of a packing-case with nails in it, and one ran into his foot. He has been poulticing it all day, and the poor chap is in a good deal of pain.

The same extraordinarily mild weather continues. Part of the day it has been blowing from a gentle to a moderate breeze from northeast and northwest, without a fall of temperature. Such weather at this time of the year in this latitude continuing so long

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is, I should say, previously unheard of. It is the kind of weather one would expect to meet with in the Shetland Islands. Max., $+30.5^{\circ}$; min., $+15.5^{\circ}$.

At 8 P.M., with light airs from west by north at our hut, there was a loud rushing sound among the cliffs of Cape Flora, apparently caused by a strong wind at a higher altitude than our hut.

Heyward came in to tell me this morning that either an ivory-gull or a "burgie" was flying over the flag-staff. I went out with a gun, but the bird had disappeared. A large flock of roches were seen flying at a distance over the water space beyond the land floe, now filled up with broken-up ice. Fine hail, thickly coated with snow, fell this morning. It was about the size of B.B. shot. (Temperature at the time, $+24^{\circ}$.)

We were busy all the morning pushing on our preparations for sledging. After lunch we tried the dog snow-shoes on "Nimrod," for amusement, as some came on board the *Windward*. He appeared to be very much disgusted with them. In walking he picked up his feet absurdly high, and altogether looked very ridiculous. I am very doubtful as to their being of any use for sore feet, as "Nimrod" slipped very much in them, and I do not think a dog can get a sufficient grip of the snow to pull well in them. They are difficult to keep on, too, and I think some of the dogs, at all events, would gnaw them off. I have left the four on "Nimrod" to see if he will let them remain there, and I intend to try him again to-morrow to see if he shapes better after getting used to them. After this we worked at the preparations for our journey until dinner-time at 7.30 P.M. In the evening I washed some clothes.

February 27th, Thursday.—While engaged in our preparations for the sledge journey after breakfast, Armitage, who had gone out for a moment, returned to say that a bear was out to the east of "Bear Berg" on the floe. As the wind was blowing in that direction, I put some blubber on the stove to try and bring him up to the hut. After some time he evidently smelt it, but catching sight of Fisher, who had gone out to keep an eye on him, he lay down, and proceeded to watch the hut. Getting rather tired of this kind of sport I had "Nimrod" slipped, and he made straight across the floe towards the bear. Seeing the dog making a dash at him, he suddenly became panic-stricken, and made for the edge of the water across some loosely crushed-up

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bay ice. Armitage, Blomkvist, and I tried to follow him with rifles, but could go no farther than "Bear Berg," where it became too unsafe to venture upon. From the top of the berg we could see the bear slowly meandering off west, with "Nimrod" trotting behind, looking very much like a huge sheep being followed along by a sheep-dog. He had quite got over his scare, and took no notice whatever of the dog, except now and then, when he ventured too close, to make a rush at him.

When on the top of the berg a flock of about thirty dogs flew over, all more or less in their winter coats. One or two were nearly white on the under parts, and one had almost got rid of the winter coat altogether. I sent the doctor down with a gun to try and get one, and I afterwards took a gun and looked out for them, but neither of us saw them again. I was anxious to get specimens.

After lunch we went on again with our preparations. I and I weighed out and put into labelled bags the oats (six pounds per day) and dried vegetables (six pounds per day) for pony food. The dried vegetables are much superior to the starchy Russian hay we carried last year. The doctor is also wearing a seal-skin coat for Armitage which I took with me on my last Expedition in 1893.

At 7.45 P.M. Blomkvist came in to say that the pups were playing at a bear behind the hut. Armitage and I took our rifles and went out, but he had disappeared. It was very dark, being misty, snowing thickly, and blowing a moderate gale from the southwest. I made a cast with "Nimrod," who had been in the hut, and found "Mr. Bear" beyond the large bowlders behind the hut standing up on his hind legs like a rabbit to go and look at us. On "Nimrod" rushing towards him he made off, occasionally stopping to make dashes at the dog. Although we followed the barking for over a mile, through drifts of soft snow to our waists, until we could only very faintly see Cape Flattery through the thick snow and mist, we could not get any nearer to him, and we got gradually left behind and had to return.

The extraordinarily mild weather still continues, and to-night I was actually walking with bare hands carrying my rifle, which any one could hardly credit as being possible without several frost-bite at this time of the year on the 80° N. latitude. The temperature at 8 P.M. was +30.2 F., with a southwest gale (force 4)

51

52

O R I A

Island 10

Placed by bearings
by F.G.J & F.N.

O

P

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Our sledging prospects are looking very bad. Most of the party are still rather pale, and all (except myself) have been taking iron pills (Blaud's) for some time. They seem fairly well, however.

February 28th, Friday.—At 8 A.M., just as we were on the point of turning out, Heyward came in to tell me that "Nimrod," who had been loose all night, and "Jinnie's" pups, now over a year old, were barking at a bear on the floe beyond the flag-staff. I put a pair of breeches and a coat on over my pajamas, and Armitage and I started off to try and shoot him. We separated and approached him from opposite directions, and on getting within thirty-five yards I fired and put a bullet into his neck, and as he slewed round Armitage put another into his rump. He, however, scampered off, although I found afterwards that my first shot had very much damaged his lungs. I shot him again behind the left shoulder and bowled him over. He was an old e-bear with yellow teeth, with one canine tooth broken. After breakfast we sledged him on to the floe at the foot of the slope at the flag-staff, up which, owing to the tremendous drifts of soft snow, we could not get him. We skinned him there, and sledged the skin and meat up to the hut by instalments. It was a thick mist and heavy snow all the morning, and before we had finished began to blow a moderate gale from the north, with a rapidly falling temperature and dense, furiously driving snow; so the wild weather did not last long, which is a good thing, as warm weather is bad for sledging.

I was very glad to get this bear, as we were running short of fresh meat, and I should have been sorry to start sledging knowing that they were run close for meat at the hut.

After lunch we went on with the sledging preparations, and Fisher and I finished weighing out all the rations. I am now quite ready, except for the rigging of three sledges and some more ship-biscuit. The temperature fell 46° between noon and P.M. with the northerly wind, and the sky cleared. This is a welcome change, but rather a sudden one. I wish it would blow hard at the same temperature for twenty-four hours to clear out and harden the deep, soft snow on the floes, which in its present state will render sledging very tough work indeed.

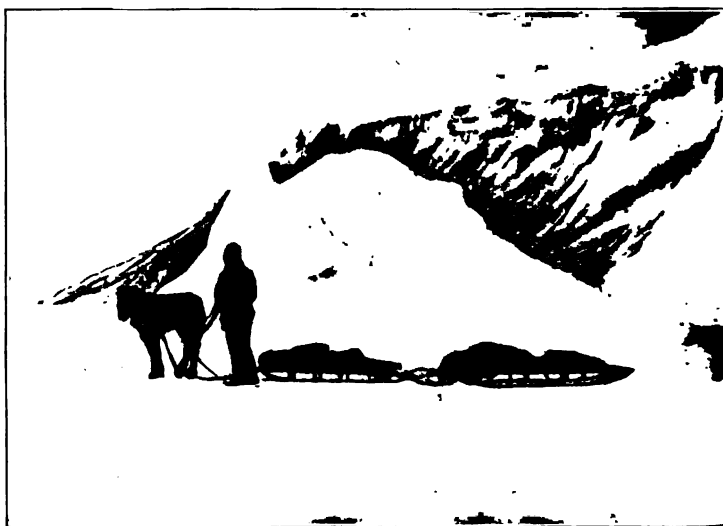
I photographed the bear as he lay after being shot, and also with a group of my chaps standing behind him. He probably

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was our visitor of yesterday. He had a partially healed bullet-wound in the flesh at the back of the head, so he has called here before.

A partial eclipse of the moon was visible here this evening.

March 2d, Monday.—We all set to work at the preparations for sledging after breakfast. Hearing "Nimrod" whining, I suspected that he could see a bear in the distance, and sent Heyward out to look round; and he returned to tell me that one was



SLEDGING-IN A BEAR-SKIN AND MEAT

on the floe coming towards the flag-staff. Armitage and I started out with our rifles, and I gave Heyward permission to come also with a rifle. We found the bear near the flag-staff busily engaged in pulling down one of the flags in the "Row," and as he came up the slope I put a .303 bullet into his neck which knocked him down, but after lying for about twenty seconds apparently dead he staggered off, and Armitage and I gave him another bullet each. Heyward also fired. I took down a camera and photographed him as he lay dead. He was a male bear, about three-quarters grown. I found afterwards that my first bullet had passed through the neck into the chest, and had shattered the

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lungs, causing an enormous blood-clot in the chest. Either Armitage or I broke his backbone just behind the shoulders after he tried to get away. The snow was driving fiercely at the time, making shooting a little difficult. We skinned and cut him up on the floe, and sledged the skin and meat up to the house. He was in indifferent condition. His stomach was full of semi-digested seal. He showed no fear whatever of us.

March 3d, Tuesday.—The very heavy snowfall of the last two months will make the flocs bad travelling, especially with such high temperatures, which we again have.

I am taking all our available dogs (sixteen). I shall of course have to rely to some extent upon shooting bears to supply them with meat. I am taking tinned beef to feed them on for a time, so as to have food which I can place in a depot for our future use when I kill a bear for them. I shall wait a day or two until the weather improves a bit, as with the present state of things at the best we should make slow progress; and on such days as to-day, when one cannot see twenty yards ahead for the dense driving snow, should have to camp, and so should be eating our food to no purpose. Surely a change for the better must come soon. It is very annoying, after waiting twelve months for sledging, to get such abominable weather as this.

March 5th, Thursday.—About 8 A.M. Armitage, who had gone a short distance from the hut to look round, ran in to tell me that a bear was close by and had given chase to him. This is a wonderful influx of bears! I was engaged in washing, and had only my pajamas and slippers on. I took my .303 rifle and went as I was, accompanied by Armitage. We found "Mr. Bear" on the edge of the pond close to the hut, making dashes at the dogs, who were yapping around him, but advancing at the same time towards the hut in the most bold manner. I gave him a shot in the neck which knocked him over backward, with his fore and hind feet together, and his back arched like some caterpillars do when touched. After a few seconds, however, he picked himself up and made off. Armitage and I fired three more shots each at him, and at eighty-five yards distant we finally quieted him. He was a three-quarters grown he-bear, in poor condition and with nothing in his stomach. On examination we found both shoulders broken and the lungs pierced in several places; a shot had gone through the heart, passing through the ventricles. There were

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also several bullet-holes in the hind-quarters and ribs. He died very hard, poor beast. We cut him up after skinning him and put the meat on the top of the hut. After this we cleared some of the snow out of No. 4 canvas hut and repaired the door. I intend to put the loaded-up sledges in there. We had just finished lunch when another bear was announced to be on the floe near the flag-staff. Armitage, the doctor, and I started off with our rifles. We kept under cover behind the rocks by the flag-staff. He gradually approached and investigated the entrails of the bears we had recently shot there, but showed no inclination to eat them, evidently objecting to his own race. I then ran back to the hut and got my hand-camera, and as he approached to within about thirty yards of me, eying me curiously, I took two negatives of him. This is probably the first attempt at photographing a polar bear on his native floe. Having taken his photograph, I called up the doctor and Armitage, who were lying out of sight about twenty yards behind, and I opened fire upon my late sitter. I knocked him over with my first shot, but, as usual, he struggled to his feet and made off; however, we soon fetched him down again. I again photographed him, and then we skinned and cut him up, and sledged the skin and meat up to the hut. He was in fairly good condition but his stomach was quite empty. It has been snowing and driving a great part of the day, with mist and overcast sky and an east wind. The thermometer again rose to $+11^{\circ}$ F.

A fox was seen on the talus yesterday evening, and the dogs were sent after him, but he escaped. He appeared considerably darker in color than the dogs, and they are far from white, owing to their love for the kitchen, the floor of which is anything but clean sometimes.

March 6th, Friday.—All day until after noon it has been blowing a moderate and fresh gale from east by south, and southeast by east, and afterwards a moderate breeze from southeast. The thermometers register $+28.5^{\circ}$ and 28° again. It has been snowing heavily all day, with very thick mist. Such a duration of warm weather in this latitude at this time of the year is previously unheard of, I should say. Never before has an Arctic expedition been delayed starting for sledging in March owing to the weather being too warm. Nares kept his men back a day or two owing to excessive cold. I am now waiting for cold

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enough weather to enable us to make a satisfactory start. This is an extraordinary climate !

March 7th, Saturday.—The same remarkable weather continues. It has been blowing from southwest and southeast (force 1 to 2) all day, thick mist, overcast, and snowing, and the thermometer at $+28^{\circ}$ F. The sledging prospects are looking worse and worse, for this weather looks as if it had come to stay; if it does it can't be helped, however, and the only consolation in it is that the greater the difficulty, the greater the fun in winning eventually. I have had everything ready now for some days, but Armitage and I made various alterations and improvements in the sledge gear, and put two of the loaded-up sledges in No. 4 hut. The snow is extremely soft and wet, and a sledge drags as heavily in it as if it were being hauled through treacle. I tried a loaded sledge in it to-day. The worst of this wretched weather is that I fear people at home may be disappointed if we do not make a successful trip every spring, and do not do things at the galloping pace that sanguine people, at all events, who know nothing about it, expect. Nothing succeeds like success, and anything but success is of no manner of use. Failure is always unpardonable, no matter whether it be within one's power to prevent it or not. However, I can only do my best; but such is the way of the world. I should say the floes up north are already in the boggy state we found them in early last May. They have certainly had more reason to be so now than they had then.

WEIGHTS ON LOADED SLEDGES

Sledge No. 1 (9 ft. 6 in.)

(In sledge cover.)		LBS.
"Odds and ends" bag		34
3 kit bags—23 lbs., 21 lbs., 21 lbs.		65
Compass (prismatic) stand		5
Hand-camera and case		7
Half-plate camera, etc., in case and stand		22
6" Aluminium sextant and artl. horizon		10½
(In sledge bag.)		
Cooking-stove, tools, prismatic compass, and quart pots		25
1 gallon of spirit, funnel, and pot		11
1 bag of biscuit		18

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Sledge No. 1—Continued.

	LB.
1 week's ration of bacon	10½
1 week's ration of cheese	4
1 gallon spirit	11
Bag with contents (skinning-knife, etc.)	10½
Drawing folios	4
.303 rifle in case	11
Militza	13½
Fur coat	5½
Total	267½

Sledge No. 2 (9 ft. 6 in.)

No. 6 ration bag	84
No. 5 ration bag	87
No. 4 ration bag	89
2 militzas	23½
1 rifle and case	12½
1 fur coat	5
Total	300½

Sledge No. 3. (9 ft. 6 in.)

No. 3 ration bag	90
No. 2 ration bag	90
Bag of dried vegetables	28
Bag of dried vegetables	28
Tent floor cloth, etc.	55
2 trenching tools	5
Total	296

Sledge No. 4 (9 ft. 6 in.)

11 gallons of spirit and 1 small tin of whiskey	121
Small line and Alpine rope	9
Bag of biscuit	19
1 pair ice-spikes and straps	2
No. 1 ration bag, with tools, etc.	101
First week's dried vegetables for pony	28
3 reindeer skins	16
Total	296

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Sledge No. 5 (11 ft. 6 in.)

	LBS.
Bag of oats	60
Bag of vegetables	56
A.'s soviek, etc.	17
F. G. J.'s soviek, etc.	17
B.'s soviek, etc.	15
Tobocks and skin-breeches (F. G. J.'s)	6
Tobocks and skin-breeches (A. B. A.'s)	6
Tobocks and skin-breeches (K. B.'s)	6
Small crow-bar	6
1 ice-axe	4
Tinned beef (dog's meat)	72
Total	265

Sledge No. 6 (9 ft. 6 in.)

Bag of oats	108
Tinned beef (dog's meat)	96
4 bags dried vegetables of 28 lbs. each	112
Total	316

Spare Sledge No. 7 (9 ft. 6 in.)

216 lbs. tinned beef and 54 lbs. extra for tins (for dogs)	270
Pony's gear, blanket, halter, and hummock chain	16½
2 pairs of snow-shoes	10
Aluminium wire, tobocks (F. G. J.'s)	2
1 ice-axe	4
Total	302½

Average weight of seven rigged sledges, 26 lbs. each: No. 1, 267½ lbs.; No. 2, 300½ lbs.; No. 3, 296 lbs.; No. 4, 296 lbs.; No. 5, 265 lbs.; No. 6, 316 lbs.; No. 7, 302½ lbs.; total, 2043½ lbs.

One pony: No. 1, 267½ lbs.; No. 5, 265 lbs.; No. 6, 316 lbs.; total, 848½ lbs.

Sixteen dogs: No. 2, 300½ lbs.; No. 3, 296 lbs.; No. 4, 296 lbs.; No. 7, 302½ lbs.; total, 1195½ lbs.

384 lbs. of dog's meat—1 lb. per day for sixteen dogs for twenty-four days.

Horse food: 252 lbs. of dried vegetables and 168 lbs. of oats—6 lbs. dried vegetables and 4 lbs. of oats per day for six weeks.

Dogs: "Smike," "Snark," "Mick," "Pincher," "Lurcher," "Pongo," "Nimrod," "Misere," "Worms," "Bismarck," "Rags," "Charlie," "Hyena," "Curly," "Carlo," and "Bear."

A THOUSAND DAYS IN THE ARCTIC

March 11th, Wednesday.—The condition of the weather is still unchanged, southeast, S.S.E., and south breezes (forces 2 to 4) during the day, and the thermometers about $+23^{\circ}$ F. Overcast and misty skies. The barometers keep high (30.579 at 8 p.m.), and we appear now to be within the area of what the meteorologists call an anti-cyclone. I hardly know what to do about starting sledging, as there appears to be no end to this astonishing weather. A favorable change (such as a gale to harden or drive away the snow and a fall of temperature) appears to be as far off as ever now we want it. I fancy I can hear some people at home, or being told of this condition of things, saying: "How very fortunate for those people in Franz-Josef Land to have such nice warm weather! Poor Sir George Nares had -40° in March. They ought to 'find' the North Pole easily." They are welcome to my share of this nice warm weather!

My sledging weights come to 2038½ lbs. (exclusive of sledges) of these sixteen dogs ought to pull 1190½ lbs., leaving 848½ lbs. for the pony. I have seven sledges averaging, when rigged with bamboo-lattice bottoms and with sledge-bags, 26 lbs. each. Six are 9 feet 6 inches long and one 11 feet 6 inches. All are of Norwegian make. I fear I cannot give the dogs more than one pound of tinned beef per day. I am carrying 384 lbs. of it, which will last twenty-four days. I am relying upon killing bears, and shall then place in depots any tinned meat I can, and carry the bear meat on in place of it. The tinned meat thus cached will come in for us on some future occasion. I am taking tinned beef for the dogs with this object instead of bear-meat, which, being untinned, of course could not be placed in depot. I expect next year I shall be able materially to reduce these weights. One learns a great deal by every journey made. Better selection of foods, improved ways of doing things, and alterations generally, which mean reduction in weights, which practical experience only teaches.

March 14th, Saturday.—Our coal is now getting very low and will not last out much longer. For some time past I have had the stove let out during the day and throughout the night, and only lighted for breakfast and towards evening. A small bucketful of coal lasts us for two days in this way.

The weather shows no improvement. The winds to-day have been from west by north, N.N.W., and west (force 3 to 5). The

A NASTY CLIMB IN THE DARK

thermometer at $+26^{\circ}$ F. Overcast and misty all day, with some snow.

March 16th, Monday.—I finished my letter to Harmsworth today and sealed it, in the event of anything happening to us.

The following letter I handed to the doctor :

[Copy]

“CAPE FLORA, *March 11, 1896.*

“R. KOETTLITZ, ESQ., M.R.C.S., etc.:

“During my absence you will take sole charge of the expedition and its affairs at “Elmwood” and will be solely responsible.

“I look to you to see that things are carried on as heretofore, and that such work as I shall specify in particular, and other which may be for the well-being of the expedition, be carried out.

“I expect every member of the party to obey you, to support you in every way, and to carry out your instructions. This I have little doubt they most willingly will do.

“FREDERICK G. JACKSON,

“Commanding the Jackson-Harmsworth Polar Expedition.”

The doctor made a blanket-coat for old “Bear”—one of the best of our sledge-dogs—whose clothes look rather the worse for wear, and I fear he may suffer for the thinness of his coat when out sledging. He and “Carlo,” the retriever, are now thus equipped.

The weather this morning looked like improving, as the temperature fell to $+10^{\circ}$ and the sky partly cleared, showing the sun, which we have only seen two or three times since he returned in the middle of February last. Since 3.30 P.M., however, with the wind in the east, the sky has been overcast and misty, with thick snow falling, and the temperature is going up again. I can't wait any longer, however, for the weather to improve, but if it isn't very bad shall start to-morrow morning and do the best we can with it.

March 17th, Tuesday.—We dug away the drifts around the doors of No. 4 hut and the stable-store, and got all the sledges down on to the floe below the flag-staff. It was not, however, until 1 P.M. that we had the dogs in their traces and the pony harnessed—what wouldn't I give for another pony or two!—as several small matters went wrong at the last moment and took time to put them right, and so caused delay. The wind had been easterly until noon, with heavy, overcast sky and mist, and snow

A THOUSAND DAYS IN THE ARCTIC

driving before a fresh breeze. But at noon, in spite of the falling barometer, the sky showed symptoms of breaking, and the weather looked like improving. Half an hour before we started heavy snow clouds were seen rapidly coming up, and snow began falling, with a fresh breeze from east by south. We found the snow excessively deep on the floe and very soft, lying in frequent drifts. On rounding the West Point the wind increased to a moderate gale, with as heavy a fall of snow as I have ever seen anywhere, and although within a quarter of a mile of Cape Flora we could not see land. We came on very rough ice at this point with very deep snow among it, through which we could not see our way at all with the dense falling and driving snow. As I could see that we should not go more than three miles before dark, and as the barometer had fallen one-tenth already since we left, we held a consultation, and as every one voted for a return which coincided with my own judgment, we started back to wait at the hut to-night and get a fair start to-morrow. This I consider far better than camping within three or four miles of it perhaps for a day or two with both the pony, the dogs, and ourselves eating our provisions and doing nothing for it; whereas by returning, although much against my inclinations, we could start again earlier in the day and with everything intact. I had the sledges all ready to start on the floe, but covered with brown waterproof canvas kit-covers, and tied "Tommy Rot" near them to give notice of the approach of bears.

I took the doctor and Fisher with us to lend a hand for the first mile or two. Both the pony and the dogs pulled their load very well considering the very bad state of the floes for travelling.

I shall start again to-morrow morning if there are reasonable signs of improvement in the weather. The thermometers have been registering from $+11^{\circ}$ to $+13^{\circ}$ all day—far too warm.

CHAPTER XXII

"THE BRITISH CHANNEL AN OPEN SEA"

March 18, 1896, Wednesday.—An improvement in the weather occurring, Armitage, Blomkvist, and I left Cape Flora at 11 A.M. The doctor and Fisher accompanied us till 2 P.M., when we were a little to the north of Windy Gully, where we stopped to make tea and to have a little lunch. It was then discovered that one of Blomkvist's ski, which had been lashed on the last sledge, had come adrift; so I went back about a mile, accompanied by the doctor, and fetched it. The temperature has fallen to 5° F. below zero to-day. Neither the dogs nor the pony have shaped as well as they did yesterday. The pony perspires a good deal and is evidently in soft condition, although she looks well. I had great trouble in getting either her or the dogs along, and spent my time after lunch in running backward and forward from one team to another, urging on each in turn.

The ice in Miers Channel is fairly level, but deeply covered with snow, which is very soft. I intend to follow our course of last spring, and to extend our discoveries northward.

We camped at 5.30 P.M., having travelled about seven miles in six and a half hours. We tied both the dogs and pony up to the hummocks. Temperature at camping time was 16° F. below zero.

March 19th, Thursday.—After rather a sleepless night, for both the pony and the sixteen dogs got loose and turned us out twice to secure them, we tumbled out at 7 A.M. and got breakfast. The minimum thermometer showed 26° below zero during the night, and things look better.

We got under way at 11 A.M., going over level ice, but with snow lying very soft and deep. Every now and then we came upon rows and fields of hummocks which required careful navigation to avoid smashes.

A THOUSAND DAYS IN THE ARCTIC

At 5.30 P.M. we camped in Nightingale Sound, with Camp Point bearing about two miles to the southeast of us. Our pony, "Brownie," is still going very badly; the dogs have somewhat improved, but both teams were very tired when I gave the order to camp.

It has been calm all day, with thick mists and clouds (str. and r. c.) coming up from the southward. Travelled by compass north 41° east (true). Passed a fox track.

March 20th, Friday.—Thick, overcast, and snowing when I called the others at 6.45 A.M.

Got under way at 9.45 A.M., passing through hummocky ice with deep snow between the hummocks. The gale in September which so smashed up the ice off Cape Flora evidently broke this up. The weather very thick, with falling snow and mist, making it difficult to pick a way, and there being no shadow, rendered it often very hard to distinguish rises from depressions; in fact we marched on in a semi-blind condition, so much so that it was difficult to see the snow upon which we walked, and everything was blurred and indistinct. Our dogs are going better.

Course N. 41° E. (true), nine miles (geographical).

March 21st, Saturday.—We found that a she-bear and cub had passed within a few yards of our camp in the night, but without stopping for a moment. They had not disturbed the dogs, who had their noses tucked under their tails owing to the driving snow and wind.

I called the others at 7 A.M., and we were under way at 11 A.M. A beautifully fine, clear, and calm day for these parts. I could clearly make out soon after starting the outlines of Northbrook Island, Hooker Island, the northern portion of Bruce Island, and a part of the coast of the land to the west. Eaton Island also was well in view. I stopped and took a round of angles, and roughly plotted them in my sketch-book. On stopping at 2 P.M. for lunch, we were about three miles off Eaton Island (about N.N.W.). The large, square, bold Rubini Rock (basaltic) near our depot, made in April, 1895, on Hooker Island, stands out very boldly and makes a splendid landmark. We crossed several tracks of bears in the afternoon. We camped at 6 P.M. about two miles from Eaton Island, it bearing about W.N.W. A mist coming up from southeast prevented my taking further angles. We are in the best of spirits; everything promises well for our

"THE BRITISH CHANNEL AN OPEN SEA"

reaching a high latitude, as circumstances now look so much better.

Course N. 45° E. Distance, nine miles (geographical).

March 22d, Sunday.—Such good weather could not last, and as morning broke it was blowing a fresh wind from southeast, with a good deal of snow-drift.

I called the two others at 6.45 A.M., and we were under way at 9.45. Soon after noon the wind fell and light airs came from the northward. On stopping for lunch, magnetic west of the large, isolated Rubini Rock, and about three miles to the west of Scott Keltie Island, I took bearings of all important points visible, and made a rough sketch.

Travelled first over hummocky ice with a good deal of deep snow, and then upon level ice also covered with pretty deep snow. Soon after starting after lunch, I saw something dark lying upon the ice, and knowing that it could be nothing else than a seal, I called Armitage, and we started off with our rifles to stalk it. We stealthily crept along, looking forward to a shot and fresh meat—seal is nice and tender. On approaching to within forty yards, very well satisfied with ourselves at getting up to our game without disturbing it, we fired, and then found that it was a seal indeed, but an already dead one!

It was a large ringed seal, and had evidently while sleeping on the ice got frozen out of its hole, and when nearly dead had been worried to death by foxes, the tracks of which were plentiful around, but no bear had been near, strange to say. The head and back flippers were gnawed and had been bleeding, showing that they had been injured before death, and there were many marks of blood around. I placed the carcass on a sledge, and on camping at 5.50 P.M. cached it under a pile of stones upon a small stony island near the northwest end of Scott Keltie Island.

To-night I can see a dark outline of what looks like land to the west of here, but it is very indefinite.

The pony's shoulders are getting much galled by the harness.

Course N. 45° E. Distance, about nine miles. Misty generally, but clearing occasionally at various points.

March 23d, Monday.—Four dogs got loose in the night, and roused us out twice. After a hard day, and having got warm and comfortable in one's furs, it does not put one in the sweetest of tempers to be woke up and have to turn out into the cold

A THOUSAND DAYS IN THE ARCTIC

again. Before we could stop them they had on the second occasion pulled open a bag of dogs' meat and eaten up ten pounds of it, finishing up with a dessert off one of Blomkvist's old felt boots!

We turned out at 6.30 A.M. and got under way at 9.30 A.M. Course north, 61° east, towards the bold headland Cape Albert Markham, but going about two miles outside of it.

Soon after starting, the pony and I floundered into an open crack about thirty inches wide, slightly bridged over with snow and with water just underneath it. I pulled "Brownie" out without much difficulty, but I got wet above my knees, soaking my fur boots, socks, and breeches, the latter of which I shall not be able to get dry again for days, and the boots not until we get back to the hut. (Temperature, 13° below zero.) How water remains unfrozen at this temperature is a mystery to me. The current must be exceedingly rapid. The ice measured two feet one inch, with nine inches of snow over it. The floe is dead level, with hardly a lump of ice upon it for miles. It can only have recently become frozen over. There must be, I think, a very strong current setting from the N.N.W. towards Somerset Keltie Island. If we only get flat floes like this, and they become a little more solid, we shall push north in fine style.

I took two bearings before leaving camp, as the mist lifted a little to the northward; and I could also very dimly make out land to the west of us, which appears to terminate at $352\frac{1}{2}^{\circ}$ (magnetic) from our camp, with a broad channel of water to the north communicating with the sea beyond.

At 1 P.M. I again stopped and took bearings, and made a sketch and then altered our course to north 46° east (magnetic), now 63° east (true).

At 2 P.M. we stopped for lunch. The mist partially lifted to the north and northeast, showing apparently an island, which we had previously suspected, with much water to the west. I decided to make for the western extreme—a low point apparently—this would take us nearly true north, and would thus save some distance, and we should explore new country. I considered it better for these reasons to take a new course in preference to following last spring's route northeast into Robert Peel Sound.

A bitter wind sprang up from southeast, occasionally chopping right round to northwest, with some snow-drift. Our course

"THE BRITISH CHANNEL AN OPEN SEA"

across a very level flow, and at camping-time at 6 P.M. I found some difficulty in discovering a suitable hummock to tie the pony and dogs up to. The ice so far is much more level than last year. Near Scott Keltie Island and Cape Albert Markham we found the ice very boggy and rotten, and I saw many flocks of dovekies flying from the neighborhood of Rubini Rock towards the N.N.W. There must be water out there.

From 10.30 to 1 P.M. N. 61° E. (true), four miles. 1 P.M. to 2 P.M. N. 63° E. (true), two miles. 2 P.M. to 6 P.M. N. 21° E. (true), four miles. Total, ten miles (geographical).

March 24th, Tuesday.—I called Armitage and Blomkvist at 6.30 A.M. and cooked breakfast, as I always officiate as cook. I first put some snow in the pot to melt, and then put on the oatmeal to cook. During the time this is going on I have a wash in a teacupful or so of water, stripping to the waist, which I invariably do every morning, and then make tea, add hot water to the dried soup, and fry some bear-meat. This completes our menu for breakfast, which soon disappears before the sledging appetites of three hungry men; and we turn out into the bitter wind and snow outside to pack up. Blowing freshly from the southeast, with a good deal of drift. We packed up under some difficulty, and continued our course round the western side of Koettlitz Island, travelling N. $4\frac{1}{2}^{\circ}$ E. (N. $21\frac{1}{2}^{\circ}$ E. true). The floe was very level and the snow surface good; the wind, which was now blowing at force 6 to 7, helped us along, and we made about two miles per hour.

About 2.30 P.M., having made seven miles (geographical), we stopped for lunch near the coast, a quarter of a mile distant. The wind was now blowing a moderate gale, with the snow drifting thickly, and prevented us seeing more than fifty yards except at intervals. Tea-making for lunch we found rather difficult work. Seeing a spit running out to the northward of us, we struck north (true) to round it. We soon came upon very hummocky ice, indicating great pressure.

At 6.20 P.M. we camped at the end of the spit, having come seven and a half geographical miles since 2.30 P.M.

The wind dropped as we got to camp, but woke up again about 7.30 P.M., preventing an observation of the moon for latitude, which we had intended to take.

Koettlitz Island has ridges bare of snow to a certain extent on

A THOUSAND DAYS IN THE ARCTIC

this side, covered with water-worn basaltic boulders. There is also a certain amount of vegetation. The plateau is about fifty feet high at the sea edge, and is evidently a raised beach.

(1) Course N. $21\frac{1}{2}^{\circ}$ E., seven miles (true). (2) Course N. (true), seven and a half miles.

We had passed a southern spit of the island without seeing it.

March 25th, Wednesday.—We made a cairn with stones upon a boulder at the end of the spit, about a hundred and twenty yards from the sea and the edge of the slope, and deposited record and jack in a tin among the stones.

[Copy]

" THE JACKSON-HARMSWORTH POLAR EXPEDITION.

" Three members of the above expedition reached this spot on the evening of March 24, 1896. We are one week out from 'Elmwood,' and are pushing north.

" A. B. ARMITAGE.

" K. BLOMKVIST.

" FREDERICK G. JACKSON,

" Commanding the Expedition.

" We are intending to make for land bearing N. 6° W. (true) from here.

This record is written in ink upon green water-proof paper, and the small cairn in which it is concealed stands upon a large boulder.

Writing in the tent when sledging is not exactly a joy, especially with ink which is frozen hard, and has to be thawed out by holding the bottle in the hands. The writing must speedily be carried on, or the ink freezes on the pen and on the paper before the sentence is completed. The hands have to be frequently thrust into the pockets to avoid frost-bite, and one feels very thankful when the operation is over.

On reaching the top of the spit or raised beach, fifty feet high, the mist partly lifted and enabled me to take some bearings of the land to the west of us; but the view was rather unsatisfactory. If only one could see properly, mapping and travelling would be much easier and pleasanter. I also took bearings of the land around Markham Sound, and that to the N.N.E.

After making the cairn and photographing it and the camp, we proceeded round the spit N. 19° E. (true), leaving at 1 p.m., passing through very hummocky ice near the island. On striking across the ice about half a mile from the island we came across a



West point of Cape Flora



Mabel Island



VIEW TO THE WESTWARD FROM NEAR THE FLAG-STAFF ON CAPE FLORA

1000
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"THE BRITISH CHANNEL AN OPEN SEA"

wide crack ten to twelve feet across, only partly frozen over, and with water standing in it. This, together with what looks very suspiciously like a water sky to W. and N.N.W., makes me feel sure there is a lot of water out there. I feel very uneasy about this water. An open sea would frustrate all our plans. We are equipped for sledging, not for boating, which is impossible at this time of the year; and water will stop us. However, I trust it may not be such as will affect us materially. The dog-team with Armitage and Blomkvist were got over safely, with only their feet going through the crust of snow over the water; but with the pony I had more trouble, and had to take her out of the sledge and pass a line round her neck to drag her over, and then hauled the sledges over singly. At 2.30 P.M. we stopped for lunch, and I again took angles. We had come three and a half miles (geographical).

After lunch we came upon level ice, and struck N.N.E., just to the west of Cape Fisher. At 6.30 P.M. we camped at a ridge of hummocks, having come seven miles since lunch-time.

A black sky to the west, southwest, northwest, and north, together with the flight of many flocks of birds towards those points, look very suspicious of open water in those directions. I trust it is a long way off, and will enable us to round Cape McClintock.

Courses, N. 19° E., $3\frac{1}{2}$ miles (geographical). N. 5° E., 7 miles (geographical). Total made good, $10\frac{1}{2}$ miles.

Our small supply of whiskey (the water portion of it) has been more or less frozen for some days.

March 26th, Thursday.—We had hardly proceeded in the dense mist and snow half a mile to the northward when we came upon an open sea of water running right across our path from the southwest and in towards Cape Richthofen. I have removed the peak from the map, as such does not exist, but have named the cape after Richthofen. Our fears of yesterday are now more than confirmed, and our way directly north is entirely blocked.

We now followed the edge of the water to endeavor to get round it, and this led us about southeast; but owing to the very dense mist and falling snow we could not see fifty yards ahead of us, and as there was no sky or wind, only a snowy pall above us and a dim, misty white circle around us, it was very difficult to steer a direct course. The three of us were too fully engaged

A THOUSAND DAYS IN THE ARCTIC

in hauling and tugging at the sledges, and in persuading our animals to push on through the soft deep snow, to spare any one to go ahead with a compass.

After stopping to make a pot of tea at 3 P.M. I tried the pony snow-shoes we had constructed at the hut, and find that she goes very much better in them. Blomkvist and I also put on our snow-shoes, which we had previously not used much.

At 7 P.M. we camped in a bay with a bold headland bearing 334° (magnetic), which, on the mist lifting later on, proved to be Cape



OUR CAMP IN ALEC TWEEDIE BAY, CAPE RICHTHOFEN IN DISTANCE

Richthofen and the bay Alec Tweedie Bay,* for we had been wandering practically blindfolded all day. Numerous flocks of dovekies and roches are continually flying north towards the open water.

Courses: various. Travelled twelve miles (geographical).

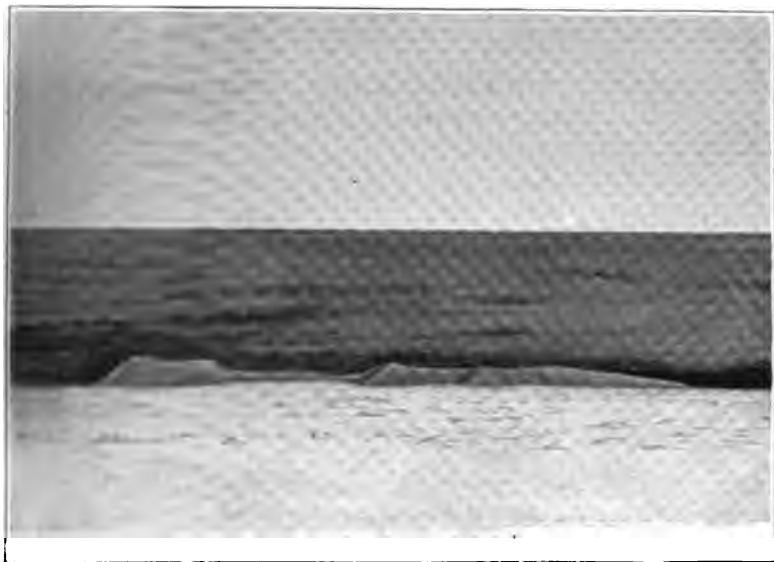
March 27th, Friday.—On turning out at 5 A.M. to look round the land on all sides was very distinct; so I took a number of photographic negatives and bearings and made sketches. Distant snow-covered land is visible beyond the southeast entrance to Markham Sound, the northern point of which I have named Cape Paterson.

* So named by me after Mr. Alec Tweedie.

"THE BRITISH CHANNEL AN OPEN SEA"

We packed up and pushed across the floe towards the cape, my intention being to round it and go eastward across the bay to the north of it, and by pushing through one of the fjords on the east side to get round the water, and thus continue our journey north.

Soon after leaving camp we passed several cracks, with water standing in them, about three feet to four feet wide, reaching



CAPE PATERSON

From a Drawing (from a Photograph) by H. Fisher

from the shore away to the westward as far as the eye could see, and thinly bridged with snow. These gave us some trouble in getting the pony and dogs over; the snow, being very soft and deep, made the going bad.

On approaching the cape I saw at a distance a glacier-face with perpendicular dirt striations in it; so I left the sledges, and taking my camera took several negatives of it, as it struck me as being very remarkable. There is nothing like a photograph to convince people. On nearing the cape we came upon crushed-up ice, and a little farther on got upon thin bay ice of only a few days formation.

A THOUSAND DAYS IN THE ARCTIC

On getting round the front of the cape we suddenly came upon open water, lightly skimmed with bay ice here and there, running right round it up to the glacier-face and cutting off our way north. From the land the edge extended at first northwest and then apparently west. Seeing that the next thing to be done was to investigate the extent and direction of the water, I turned our teams round, as we were upon thin bay ice, with a wet, soft efflorescence upon it, and pitched our camp close to the land on the east side of the cape near where the glacier-face begins.

Having had some food, Armitage and I ascended the cape by the glacier to get a look round, finding it to be 700 ft. by aneroid. Temperature at sea-level was 3° below zero, and 4° below zero on the summit.

To our great surprise, on reaching the top we found that the water is of very great extent—a perfect sea, in fact—and extends through southwest, west, northwest, and north as far as the eye can reach, and without any ice in it to be seen but thin bay ice here and there, perhaps an inch thick, with streams of water between the patches, and one solitary berg, apparently aground, near Cape McClintock. The water reaches from the glacier-face below the cape, and washes the high precipitous face of the glaciers on the western shores of the British Channel, all the ice having evidently been driven to the northward by a southeast gale. No King Oscar or any other land of any size can lie in that direction, or it would hold the ice.

It is evidently quite out of the question to go farther north in this direction. And this together with the experiences of last spring satisfy me that I shall have to find another route north, as this land is evidently only an archipelago of islands, and the continental mass that the maps portray vanishes into thin air. It is very disappointing thus to have one's plans upset by the fallaciousness of what were considered as facts.

I took bearings of all important points, and as the sun was in the west and the horizon clear, it showed up the land to the west very plainly. I could make out another island to the north of the land previously seen, and a very distant island west of that, about forty-five miles off.

Nothing approaching "main-land" can be seen either west or northwest, and only insignificant islands can be seen to the north. Probably one is the western of the three islands seen

"THE BRITISH CHANNEL AN OPEN SEA"

last spring. A boat at this time of the year would be quite useless for pushing on, for in a very short time it would become frozen into ice over which one could not walk, and through which a boat could not sail.

I am disinclined to follow Payer's track up Austria Sound unless I can pass his farthest point considerably, which I can hardly expect to do this spring, especially with so much water about and a water sky in the direction of Austria Sound, indicating open water there. The most I can hope to do in Austria Sound is to correct or confirm Payer's map, the former of which I did not come here to do, and which, to say the least, is a very unsatisfactory task, and one for which we shall receive no thanks, but rather the reverse; and the latter is unnecessary. I consequently have the greatest objection to following Payer's footsteps. I fear the folk at home will feel disappointed about this—I know I do. I mean to try to explore the country in the neighborhood of McClintock and Brady Islands, and then strike west and map in the country to the north of Peterhead. By trying Austria Sound we shall probably be stopped by water in such an unfavorable season before we reach Cape Fligely, and will then accomplish nothing. My companions quite agree with me.

I believe there is a feasible way north through here for a ship, and I hope to take the *Windward* through the British Channel this summer, and round by Cape Mary Harmsworth, in which way a great deal can be done in a very short space of time and with little risk to the ship.

I got the fingers of both hands a good deal frozen while taking bearings, sketching, and using my camera on the summit, for to do these things quickly and well bare hands are necessary. A gale of wind was blowing up there, although only a gentle breeze was moving on the ice below. An ice-dome of not more than fifteen hundred feet, sending down a glacier into the small bay by the aluminium boat depot, rises from behind some rocks in the bay east of this cape.

Richthofen Peak should be situated here, rising five thousand feet, but none of us can see it!

Payer probably mistook a cloud with the sun shining behind it for a mountain, and banks of mist for the land he has wrongly mapped in. In the Arctic, where mists lie very low, and owing

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to the very cold atmosphere are often very sharply defined, this mistake is easily made, and I have myself seen cloud looking so much like land that I have gone into the hut to get my camera to photograph it, to enable people at home to see how much it sometimes simulates land ; but on the occasion to which I refer it had so altered in appearance on my return as to be valueless for the purpose. Payer has done most excellent work in Franz-Josef Land, and but for the courage, hardihood, and perseverance of himself and his companions Franz-Josef Land would remain within that dark area of the polar regions marked "unexplored" on our maps. Both Mr. Leigh Smith and I—and I am sure I may add his name to my testimony—owe what we have been able to add to science and the knowledge of the world here to Weyprecht and Payer's adventurous voyage in the *Tegethoff*, and to Payer's plucky sledge journeys.

CHAPTER XXIII

WE DISCOVER NEW LAND

March 28, 1896, Saturday.—A bear approached the camp at 3 A.M., and the barking of the dogs turned us out. He, however, got scared and cleared out. At 8 A.M., while I was cooking breakfast, he returned, and although I knocked him over three times with shots from my rifle he got away.

We made a cairn of stones on the southeast side of the cape, near the foot of the talus, and placed in it a spirit-tin containing a "jack" and the following record :

" THE JACKSON-HARMSWORTH POLAR EXPEDITION,

" *March 28, 1896.*

" Three members of the above expedition arrived off this cape on March 25, 1896, but meeting with a vast extent of open water reaching southwest, west, northwest, and north, they pushed on east for the land and camped here on March the 27th, when Armitage and Jackson ascended the cape, and at the points of the compass mentioned could see no ice as far as the eye could reach, and only two islands beyond the immediate land to the northward.

" We are leaving to-day to explore to the west of Brady Island before returning to Cape Flora, seeing that a further advance north this season is impossible.

" A. B. ARMITAGE.

" K. BLOMKVIST.

" FREDERICK G. JACKSON,

" Commanding the Expedition.

" The open water runs into the land at this cape, cutting off all advance north."

Having made the cairn and deposited the record, about eight yards from the beach and one hundred and fifty yards from the ice-slope coming down off the cape, we packed up and proceeded

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diagonally across Markham Sound. Course, S. 33° E. (true) over deep, soft snow, which made it heavy going.

About a mile and a half southeast of Cape Richthofen we came upon an open crack, with water standing in it, about forty inches wide. This we got over without much difficulty. The ice was two feet four inches thick, with eighteen inches of snow covering it.

At 3 P.M. we called a halt, having travelled six miles. It has been snowing all day, with a dense mist. Having made tea and had some cheese and biscuits for lunch, we proceeded another mile on the same course, when the mist lifted a little, showing the land to the south of us apparently split up by a narrow fjord or fjords. The country here rather suggests the west coast of Norway in the winter. Most of the rocky bluffs are ice-domed and of the prevailing basalt. One hill on the eastern side of the fjord appears to rise to a height of 1500 to 2000 feet, the highest I have yet seen in Franz-Josef Land. On seeing this I decided to make for the northern end of the fjord, on the east side of an island named by me David Wilton Island, composed of a huge flat-topped basaltic rock, which appears from our position to be rectangular, instead of proceeding down to the sound farther to the eastward. I had seen a short way down this sound from my position on the summit of the cape yesterday, and I have every reason to believe that I can push east out of it after exploring the fjord we are now making for, as we must hit the eastern end of Allen Young Sound by pushing south.

We now struck out S. 14° E. (true), and travelled in this direction five miles, stopping at 7 P.M.

In the afternoon Armitage used his snow-shoes, which enabled him to get along better. He had numerous spills, as he is unused to them, but got on better towards evening. The chief drawback to his capsize was that whenever he went head-over-tip the dogs at once stopped, presumably either to laugh at or to admire his performance, and this led to consequent delays, as the four sledges had to be hauled up each time to give them a fresh start; but we got some fun out of it. I could take no angles to-day owing to the mist and snow, and I intend to camp until it clears a bit to enable me to do the necessary mapping. Better to take longer and do it correctly than to push on and accomplish nothing of value to any one.

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Courses: S. 33° E. (true), 7 miles. S. 14° E. (true), 5 miles. Total, 12 geographical miles.

I only count miles made good in definite courses from point to point, as distance allowing for winding about to avoid obstacles cannot be accurately reckoned, and an estimate of distance covered allowing for wanderings can serve no good purpose, and has only been adopted by some travellers to increase the distance covered on paper, which in most cases is very much over-estimated.

The thermometer has risen as high as $+13^{\circ}$ to-day. This spring has exhibited the most extraordinarily mild weather on record for these latitudes, I should say.

March 29th, Sunday.—The thermometer is up at $+15^{\circ}$, and a gale (force 7) is blowing from the west, with thick driving snow and dense mist. As I wish to take bearings and sketches, and, if possible, photos, before proceeding into the fjords to the south, I have decided to camp for it to clear a little. The rise in temperature is playing havoc with our furs, which are getting very wet inside the tent and are beginning to rot.

I took the opportunity of our wait to have a good mending of our gear, and we spent the time in smoking and in reading one or two copies of old newspapers which we happen to have with us—even the advertisements are not neglected. They are often more amusing than news nearly two years old. The weather became worse, with very thickly falling snow, as the day went on, and we could not see more than thirty yards from the tent. Our camp is extremely uncomfortable, and the weariness of waiting for the weather to clear is almost unbearable. Inaction, of which one has such a large share in the Arctic, is very trying. We are very tired of these "bad-weather camps."

March 30th, Monday.—Still blowing hard from the west, with dense mist and thickly driving and falling snow. The ribs on either side of the entrance to the tent have given way, and the snow drives into it in a most persistent manner, making everything a bit uncomfortable as a consequence. I feel a little uneasy lest the westerly gale should cause sufficient swell in the sea to the west of us to break up the ice upon which we are camped, but I think it is sufficiently strong to withstand it, and the wind may bring in the pack from the northwest against the floe edge, which will protect it. We have spent the day in much the same

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manner as yesterday. The thermometer has kept at $+15^{\circ}$ very regularly. I am inclined to think that our aneroid has gone wrong, since it stands at 30.80, and has only fallen a very little in spite of this beastly weather. They are very unreliable things, and I have a great dislike for them, but it is impossible to carry a mercurial barometer sledging.

March 31st, Tuesday.—Early this morning there was some improvement in the weather, and I had intended after breakfast to set to work to dig the sledges out of the drift in which they are buried, but it soon came on as bad as ever, blowing from the west, with dense mist and thickly driving and falling snow.

We remained camped all day, as I do not wish to proceed farther south until I can get a view of the surrounding country to continue my mapping. I refilled my hand-camera and placed fresh films in the dark slides of the half-plate camera. We spent the day in reading and smoking, and occasionally making remarks uncomplimentary to the present weather.

At 9 p.m., as I was cooking our dinner, I saw a bear coming towards our camp from the east at a fast trot. I hastily got out my Lee-Metford rifle and hand-camera to take a snap at him as he came up. At twenty yards off I gave him an exposure of one fifth of a second, but, unfortunately, found afterwards that I had stop thirty-two on instead of stop eight, which with the dim light I fear will be insufficient.

He came on without a moment's hesitation and with the utmost boldness. Why should he fear? He had never come in contact with man before probably. When he was about fifteen yards off the tent I laid down my camera and shot him through the neck. He reared up on his hind legs, probably owing to the shock caused by my bullet, and Armitage fired at him in that position but missed him, and he then made a rush towards a group of four dogs which were tied up to an ice-axe driven into the snow, but a second shot from Armitage in the shoulder induced him to change his plans and rolled him over. He, however, got up again, like the cat with nine lives, and made off at a great pace; but another shot from me behind the shoulder at about sixty yards knocked him out entirely. He was a fine he-bear, and I noticed that there were indications about him that it is the rutting season, which may account for his boldness and absence of all caution. He was in rather poor condition, and had only

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some paper, picked up near our camp, and some blood in his stomach. We gave the dogs a huge feed, and I intend to take a quantity of meat on with us and to make a cache of sixty pounds of tinned beef on David Wilton Island to the south of us.

There is every appearance this evening of open water in the E.N.E. and S.S.E. from here; a heavy laden watery-looking sky overhangs those points, but water skies are often deceptive. I, however, feel sure there is open water in Austria Sound to the north of McClintock Island.

April 1st, Wednesday.—The day opened bright and clear, and after having breakfast I took several negatives and a round of bearings, and made sketches from the top of a flat berg (photographed) near our camp. After digging out the sledges, some of which had entirely disappeared from sight in the drift, we packed up, and started for the eastern side of the rocky table-topped David Wilton Island, about five miles off, and Cape Ballin Temple, a little to the east of it, upon Bromwich Island, being very glad to leave our late uncomfortable quarters. This we reached, after about two hours' travelling over fine level ice (S. 7° W. true), and stopped for lunch near its southeast side. Here I made a cache of the sixty pounds of tinned mutton, which will be useful next spring perhaps, covering the tins carefully with large stones.

The cache is towards the southeast extreme of the island, immediately below some low rocks which jut out of the talus of the cliffs and seventy yards from the floe edge.

We placed some large stones upon a boulder above the cache to attract attention. We then started off S. 60° E. for three-quarters of a mile to get into the centre of Vesey Hamilton Channel, named by me after the Arctic explorer, Admiral Sir Vesey Hamilton, to enable us to see both sides of it, as it was now misty. At 7.30 P.M. we camped on the lee side of some low, flat bergs west of the conical rock.

An ivory-gull put in an appearance at the skeleton of the bear just before we left camp, but did not stay more than half a minute.

Courses: S. 7° W., 5 miles; S. 60° E., $\frac{3}{4}$ mile; S. 12° E., $3\frac{1}{2}$ miles. Total, $9\frac{1}{4}$ miles.

We were pushing down the fjord, the dog-team being ahead, when flames surprised our eyes and the scent of burning reached

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our noses. What could it be amid these icy wastes. The mystery was soon explained—we had a conflagration upon the second dog-sledge. Blomkvist, in knocking the ashes out of his pipe, somehow or other managed to set fire to the ration-bag and a gun-case with the government rifle inside—which, fortunately, did not proceed to distribute bullets around—burning large holes in each. The fire spread so quickly that it burned the horizontal bar of the sledge. It was but a momentary excitement ; but



IN VESEY HAMILTON CHANNEL

it came as a blessing, for it gave us food for conversation for hours afterwards and jokes at Blomkvist's expense.

April 2d, Thursday.—Started in a dense mist with overcast sky, and soon after leaving camp it began to snow. We pushed on down the narrow fjord, finding great difficulty in seeing a way, as owing to the fog the land seemed to surround us, and no outlet was visible. I had much trouble in keeping the pony's snow-shoes on, as the canvas has got very hard and stiff and chafes her feet just above the hoofs. I must improve upon them for next year.

We stopped for lunch under the lee of a berg, having gone four miles. We always dislike stopping for lunch, as we get very cold in the process. Imagine sitting on a sledge, six inches from

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the ice, in thickly falling and driving snow, with a high and bitter wind blowing, trying to cook one's food. Every now and then we would get up and stamp about to restore the circulation to freezing feet, or to swing one's arms across our chests to induce warmth to our bodies and frost-bitten fingers. We did not linger longer than was necessary over it, and were always glad to move on again and return to our tugging and hauling at the sledges, tired though we might be. It was still snowing heavily, with a fresh southerly breeze, and was very misty and overcast. The land appeared to shut us in ahead, but the light was such that we could see nothing a quarter of a mile away to be sure of it. We pushed on, and presently an exit opened out in front of us. After going about two miles we were abreast of a bold, high, basaltic, rocky headland, which I named Cape Taylor, after General Sir Richard Taylor. We passed a low berg, evidently aground, and surrounded by water and thin ice. In the water a number of dovekies were swimming. Shortly afterwards we passed two more bergs, also doubtless aground, and surrounded by water in which were dovekies. I also noticed a walrus hole, by the side of which a walrus had recently been lying, to judge by the fresh dirt on the edge of it. The floe now became very thin and wet, nothing but recent bay ice, in fact. Considering the unsafe appearance of the water beneath the snow, the dense mist which prevented our seeing ahead, and the very evident indications of open water being at hand, I changed our course from E.S.E. towards Brady Island, and struck out for Cape Taylor to the westward. This we reached after great trouble and hard work, for the floe as we advanced became very rotten, and we waded about in slush up to our knees, being obliged to take our snow-shoes and ski off to help the dogs. They were frightened out of their lives, and instead of attempting to pull, they all clambered upon the top of the leading sledge and howled dejectedly, evidently thinking they would be drowned. They could only be got off the sledge with great trouble. After much bother I got "Brownie," who behaved very well, and my sledges to the shore, and, leaving her there, returned to help Armitage and Blomkvist with the dogs and their four sledges, which we had to haul singly to shore, as they dragged terribly heavy in the boggy slush, and the dogs were too much scared to do any steady pulling.

We eventually camped about 11 P.M. on the shore at the south-

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east point of the headland, and were very glad to be on *terra firma*. I noticed a small glacier coming over the face of one of the basaltic rocks on the western side of Vesey Hamilton Channel, running down the talus to within three hundred feet of the bottom, and there ending in an abrupt perpendicular face about twenty feet high. A number of small bergs had broken off the glacier-face, and had rolled down the talus and were lying at the foot of it.

I saw a "mollymoke" near our camp of this morning. All of the rocks in this neighborhood are similar in character to Cape Flora.

Courses: S. 5° W., 7 miles; N. 80° W., 1 mile. Total, 8 miles.

April 3d, Friday.—Turning out at 5 A.M., the mist partly lifted to the eastward, showing open water reaching entirely across the sound, and quite cutting off any advance in that direction, which I had intended to take. The temperature has risen to +22°, and it is snowing, overcast, and very misty. After breakfast I wrote the following record, which I placed in an empty spirit-tin, together with a jack, and buried it in a cairn made of stones upon the top of a large boulder, near the southeast point of the cape and about thirty yards from the shore. The talus at this point runs nearly to the water's edge, and there is very little of the usual plateau or raised beach. More to the westward the rocks recede farther back.

"THE JACKSON-HARMSWORTH POLAR EXPEDITION,

"April 3, 1896.

"Three members of the above expedition reached this spot at 9 P.M. on April 2, 1896, being prevented from proceeding farther in a southerly direction by rotten ice and open water in the straits to the eastward. We intend to endeavor to cross the sound to the westward, or, finding the ice too rotten, to retrace our steps into Markham Sound, and to return to Cape Flora by our route of last spring.

"A. B. ARMITAGE.

"K. BLOMKVIST.

"FREDERICK G. JACKSON,

"Commanding the Expedition."

We started along the slope of the shore skirting the cape, carefully keeping off the floe until we came to the face of a very rough glacier, having a very crevassed, hummocky, and uneven surface, and near the face of it, hardly detached from the glacier, were a number of more or less broken-up bergs, which evidently

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had not sufficient water to launch them and enable them to get away, but had been jostled along in front of the ice behind. Some were quite black from having been turned over and over in the mud. At this point we were obliged again to take to the floe to proceed farther, and to our great relief we found it here fairly sound, although deep with soft snow. It has been snowing all day (like that of an English snow-storm, in heavy, large flakes), and the thermometer at noon rose to $+27^{\circ}$, with dense mist, overcast sky, and a southeast wind blowing. We stopped for lunch off a berg near the western extremity of the glacier, where I photographed our caravan. We had come three miles (direct) N. 70° W. We then pushed on, and rounded the long tongue of land in front of the bold rock (700 feet high) at the southwestern extreme of Fridtjof Nansen * Island, and camped on the snow-slope on the western side.

Course: N. 70° W. (true), 7 miles. Total, 7 miles.

The incline of the rough glacier is small, not more than from six to eight degrees, and the country behind is about nine hundred or a thousand feet high. The two high headlands to the east (800 feet high) and one 1300 feet high send down the ice from their caps and form the glacier. I think it would have been nearly impossible to take a sledge across it, owing to its broken-up character. One berg lying just off the face of the glacier had evidently been rolled over and over in front of the advancing ice, and was as black as an ink-bottle from the crown to the base.

I am doubtful if this plateau is a raised beach, as the stones on the surface showing above the snow are pointed and angular, and exhibit no signs of water-wear. I could find no drift-wood, but the spot is not a likely one for it. The height is about eighty feet. It may, however, be a raised beach, but covered with angular *débris* from the rocks above. Snow rendered an examination difficult.

April 4th, Saturday.—As soon as I turned out, the weather being fairly clear except to the eastward towards the rotten floes and the open water, I ascended to the top of the plateau and took bearings and sketches. We then packed up and proceeded across the Robert Peel Sound towards the round of the glacier to the

* Afterwards named by me after Dr. Nansen.

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north of Guy's Head, which I named after Guy's Hospital out of compliment to our doctor, who studied there, where we took an observation for latitude and longitude last spring. In common with all the other ice we have met with, the sound has cleared out since last spring, and now the ice in it is quite level, instead of very hummocky, as then. We camped for lunch close to the old columnar rock, Guy's Head, near the site of our camp of May 7th last spring. I again took bearings. The weather has been very misty and overcast, occasionally snowing, and the very high temperatures make the snow bad going. After lunch we kept on the same course, as I wish to accurately define the southwestern side of the island—it was misty when we passed up about three weeks ago. I also wish to map exactly and to complete the land extending northward from Leigh Smith's Peterhead. We stopped at 6.50 P.M., having proceeded eleven miles from the morning camp. I stopped on two occasions after lunch to take bearings and sketches when the mist lifted a little, and also did so on stopping to camp for the night.

A flock of looms were seen flying westward this afternoon. The snow on the floe has been very deep and soft. There has been a heavy snowfall here since we passed across it in the middle of March, and apparently very little wind. There is evidently open water in De Bruyne Sound near the first depot we made on Hooker Island last March year. We could see a water sky at the southeast end of Smithson Channel.*

Course : N. $69\frac{1}{2}^{\circ}$ W. (true). Total, 11 miles.

April 5th, Sunday.—We woke up this morning to find that we were camped within half a mile of open water. The northern water has apparently extended south since we passed north in March, or else owing to the thick weather we went close to it without seeing it. I am now going to march a bit south of west to avoid it. This is a country for open water, it meets one at every step. A dense mist came up just before we left camp, which prevented our seeing more than fifty yards around. We stopped for some food after going eight miles a little south of west, when the land to the east of us showed out through the mist and I took bearings.

* Named by me after Mr. G. E. T. Smithson, Secretary of the Tyneside Geographical Society.

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Then proceeded S.S.W. (true) four miles and camped, and I took bearings and sketched in the coast-line to the east. No land can yet be seen to the west of us or anywhere in that direction.

Courses: W. (true), 8 miles. S. 83° W. (true), 4 miles. Total, 12 miles (geographical).

April 6th, Monday.—On turning out only land to the eastward and the land to the northwest could be seen, and also a small island (probably Eaton) bearing 197° (magnetic). Later on the mist lifted, showing an apparently entirely glaciated land (no rocks visible) to the westward. We have now a better temperature, the thermometer being $+5^{\circ}$, and towards night 2° below zero. I took bearings and made sketches.

April 6th (3 P.M.).—After leaving our camp we proceeded two miles N. 82° W. (true), and I took one series of bearings, and then S. 85° W., three and a half miles till lunch, when we stopped and took bearings, astronomical double altitude observations for latitude, longitude, and variation, and then proceeded S. 85° W., till we camped for the night.

We passed through very deep snow, and a great part of the distance over very hummocky ice; I, however, have seen no old floes since we left Cape Flora, only ragged detached pieces of ice frozen into last winter's ice. This shows that there was navigable water at the end of last summer throughout the whole of our course.

I shall certainly take the *Windward* north, when she comes up this summer. Sledging over a navigable sea is absurd. The mist lifted about 10 A.M. this morning, showing the land clearly at all points except to the westward and southwest, and lifted in these directions at intervals, showing the land indistinctly. The sky cleared and the sun shone brightly till about 4 P.M., when it began to cloud over from the southward. I took angles at three positions, and at 3 P.M. (2 P.M. would have been a better time) Armitage and I took astronomical observations for double altitude with sextant and ice horizon for the latitude, longitude, and variation. Two hours after noon is supposed to be the limit in these latitudes for observations by double altitudes. The sun is putting a glaze on the snow, but is weakening the crust, which lets us through with a jerk at every step. I took three photographic negatives of our lunch and observation camp.

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On stopping at 9.15 P.M. to camp, a moderate southerly wind was blowing and the sky was fast clouding over with dense mist. The wind rapidly increased to a moderate gale from southeast at 10 P.M., with a quickly falling barometer, and the weather generally looks very ugly again.

Courses: N. 82° W., 2 miles. S. 85° W., $8\frac{1}{2}$ miles. Total, 10 miles (geographical).

April 7th, Tuesday.—This morning it is blowing a strong gale from E.S.E., with fiercely driving and falling snow, and the atmosphere is so dense that one cannot see twenty yards in any direction; consequently we have to remain camped, few things being so irksome and generally disagreeable. Snow drives in all over the interior of the tent, our furs and gear generally in a very moist state, and the condition of things anything but pleasant. We can't stand up to stretch ourselves, and even when lying down the three of us do not have much spare room. We spent the day smoking and reading a two-year-old newspaper, even the advertisements receiving close attention. We almost know some of them by heart. The gale continued throughout the day with unabated violence, although once or twice it lulled for a few minutes, which gave rise to hopes that we were getting towards the tail end of it. The atmosphere is as thick as a hedge with falling and driving snow and dense mist. I hope the violence of the wind will not break the ice up, and send us adrift.

April 8th, Wednesday.—The gale continued throughout the night, but lulled about noon to a strong wind, with thick mist and snow, and the weather looks very promising of further favors to come. Our sledges are buried out of sight, and deep drifts have formed around and half buried the tent. I removed the exposed negatives from my hand and half-plate cameras, numbered the films, and filled the hand-cameras and dark-slides with fresh ones. Armitage worked out the observations taken in position on the 6th, and we all growled at the weather!

The gale has woke up as fiercely as ever, and dense mist, with driving and falling snow, is the order of the day.

I had an attack of migraine during the night and turned out with a bad headache in the morning. Blomkvist complains of pains in his back—doubtless from sitting so long in the cramped position in the tent. We laugh at our aches and pains, but wish we had here some of the arm-chair geographers from home. Yes,

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we wish we had them here, to enable them to enjoy themselves, and to give them the opportunity of gaining some experience of the difference between real and imaginary exploration in unknown and inhospitable regions.

April 9th, Thursday.—There is some improvement in the weather this morning, but it looks anything but promising. We are very anxious to move on, for a more uncomfortable camp it is difficult to imagine. Everything inside the tent is reeking with wet, and our furs are rotting fast and giving forth most unpleasant odors, owing to the prevailing high temperature, as there are only a few degrees of frost, and all our clothes are damp and feel sticky. Armitage is complaining of lumbago, and Blomkvist of cramp. I'm sure I don't wonder at it. The snow is cut into ridges, but is little hardened. The wind alternately freshens up to a moderate gale, and then slackens to a fresh wind. Snow is falling and driving into the tent. We set to work to dig out the sledges so as to be ready to start; they were buried three feet down in some cases.

Some little improvement occurring at 6.20 P.M., having had more than enough of our camp, we set out in a strong wind and driving snow, and after proceeding two and a half miles S. 82° W. (true) we got among very hummocky, broken-up ice, with numerous traps; the pitfalls were so many and frequent that I feared for the pony's legs. To get clear of this stuff I altered the course to south (true), and after going another three and a half miles we camped at midnight.

The snow has been exceedingly deep and soft, the sledges drag very heavily, and the temperature of +28° makes it of the character and consistence of moist sugar. At noon to-day the snow was melting on all such articles as absorb heat. "Carlo" and "Bear" have been entirely on the sick-list during the march to-day. The former I tied upon a sledge and covered him up, as he cannot even walk. He has done very well, poor old chap, and is very game. "Bear" is not quite so bad, but walks by the side of the sledges. I took bearings of Eaton Island and the Rubini Rock on arriving at camp to fix our position. No other land can be seen.

Courses: S. 82° W., 2½ miles. S. (true), 3½ miles. Total, 6 miles.

April 10th, Friday.—Blowing a moderate gale from S.S.E., with

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falling and driving snow, becoming southeast later on, and the weather looks as nasty as ever.

We, however, packed up and started, carrying poor "Carlo" on the sledge, as he seems no better, and leading "Bear," who looks most dejected.

We struck S. 31° W. through hummocky ice towards indistinct land seen early this morning. I am very anxious to accurately define the land running north from Leigh Smith's Peterhead but the badness of the weather has prevented our getting a fair sight of it once. After going on this course for four miles, wondering about very much owing to the rough ice, we again came upon the broken-up, trappy ice, and to avoid it I struck about S. 20° W., and went a mile and a half. The falling snow has so increased in density, together with the thick mist and the already fallen snow driven by the wind, that it became very difficult to see the snow beneath one's feet, and Blomkvist and the leading dog-sledges toppled over the edge of a sharp drop several feet in depth, which had been cut by the wind round the edge of a large hummock, before he saw it, and they arrived at the bottom in a very mixed-up condition—sledges, dogs, and man in a confused heap, from which proceeded howls and unparliamentary English. This and similar little accidents induced me to give the word to camp at 7 P.M., as I feared that we should get a sledge or two smashed in this worse than semi-darkness. Clothes and pockets are full of wet, clinging snow, and everything is moist. (Temperature, 28° , falling to $+20^{\circ}$.) Poor "Carlo" died during the afternoon. Doubtless, as he "gave up his life in the cause of science," he is more than satisfied, and science will feel very grateful to him. On examination, his lungs showed traces of inflammation. Probably this delightful weather brought it on.

Courses: S. 31° W., 4 miles. S. 20° W., $1\frac{1}{2}$ miles. Total, 5 miles.

April 11th, Saturday.—Snow falling and driving this morning with moderate southeast, west, and west-southwest winds. It was snowing heavily when moving camp, with thick mist, but cleared up a bit as the day went on. We proceeded S. (true) for four miles and then stopped for food. The mist was very dense at first, and the snow throughout very deep and soft; but about 3 P.M. it cleared somewhat, giving me indistinct outlines of the

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land to the westward, and was fairly clear to the east. Peter-head is rather a mystery to us. No sign of a headland is to be seen, or even land at all in the position assigned to it on Mr. Leigh Smith's map, and it must be farther west. He evidently came up here in very misty weather, or he must have seen the land east of here, which is very distinct and bold, especially the Rubini Rock. All the land to the west is low and undulating near the coast, and doubtless the glacier projects some distance beyond the land. However, the conditions of the last week have been very bad for seeing coast-lines distinctly.

The lights varying very much have rendered any attempt at judging distances of land very difficult, the same land looking five miles distant at one moment and five minutes later looking twenty.

On viewing Camp Point on the mist lifting for a few moments, bearing S. 7° W., we made for it, and later on kept three points farther west to clear it. We camped at 8 P.M. and then apparently Camp Point bore from us, about seven miles distant, S. 8° W.

Courses : S., $5\frac{1}{2}$ miles. S. 7° W., $2\frac{1}{2}$ miles. S. 10° W., 2 miles. Total, 10 miles.

April 12th, Sunday.—Very misty, snowing, and a moderate gale blowing from southeast. Armitage is complaining of rheumatic pains in the back, and Blomkvist had toothache during the night ; not surprising after the time they have had. In spite of the vile weather I determined to push on instead of camping. Started off S. 22° W., and went four miles and then stopped for food. It was snowing very heavily and driving before the gale, which was now from the east, and during the hour and a quarter we halted the sledges became nearly drifted under. We then went on for another mile and a half on the same course, when the mist and snow cleared slightly, showing Camp Point about a mile and a half to the east of us. We then struck southwest for the west point of Cape Flora. The weather continued bad, and the gale and snow continued. To cut short the discomfort of such weather I determined to make a forced march to the hut, although we were fifteen geographical miles away from the settlement. At 10 P.M. we stopped for three hours, put up the tent, and gave all the animals a feed and rest, and had some oatmeal porridge ourselves. The wind had now dropped to a moderate

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breeze and had changed to northeast, and gradually increased in force to a fresh gale. We reached our hut at 4 P.M. on the 13th, having travelled twenty-one miles. We had used snow-shoes continually for the last fortnight owing to the deep snow, and the pony has also been similarly equipped with some we had made for her. She certainly could not have got along at all without them. Round the west point of Cape Flora we found the ice swept clean of snow by the gale then blowing. We hauled the sledges up the flag-staff slope on to the pond near the hut. Our shouting to the dogs aroused the sleepers within, and they turned out and gave us a hand, which we were glad of being cold, tired, and hungry. All were well and everything had progressed satisfactorily in our absence.

Courses: S. 22° W., $5\frac{1}{2}$ miles. S. 45° W., $12\frac{1}{2}$ miles. E., miles. Total, 21 miles.

CHAPTER XXIV

AT CAPE FLORA

April 13, 1896, Monday.—We got back to our little settlement at four o'clock this morning, having made a forced march from De Bruyne Sound, about six to seven geographical miles on the northern side of Camp Point, travelling all day and night on snow-shoes, with a gale of wind blowing and dense snow falling and driving. Altogether it was a most unpleasant march. Our journey has been a most disappointing one so far as getting north is concerned, especially as we all three felt quite certain, after we had got along so well during the first week, and the animals were improving in their going, of beating the record of the "Farthest North,"* if we only had sound ice to travel upon. We have, however, been able to do some useful geographical work, having determined the extent of Northwest Franz-Josef Land, mapped in the western coast of the British Channel, and traced new coast-lines. We have corrected and verified my map made last year, and have made a depot in a position which will be useful next spring, when I mean to try and push north *via* Rawlinson Sound, as I am convinced that the route I have now attempted two years is impracticable on account of open water in the British Channel and the Queen Victoria Sea.

From what I have seen of the ice up north this year, I feel more than ever that we were lucky to be able to get off it in time last year. I quite believe that open water does not occur through any chance of circumstances, but that conditions (strong currents and gales) which cause it are fairly constant year by year, and that where it is met with one year one may reasonably expect to find it the next; or, if not actually open water, boggy floes, which are closely approximate to it, and which a

* Nansen chose this as the title of his book nearly two years later.

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gale of wind from a certain direction will quickly convert into open water. It is a great pity that the route I have tried is a failure, as it led directly north, whereas the one by Rawlinson Sound trends a long way eastward. Rawlinson Sound is, however, so far as I can see at present, the only way north now from Franz-Josef Land.* This part of the world is a difficult one to travel in on account of the liability of being cut off by open water and its climate bad, even for the Arctic. Who could have foretold this expanse of water would confront us, or that Franz-Josef Land was not the land-mass of possibly continental dimensions depicted on the map and so believed to be by Arctic authorities. We have, at all events, proved that it is not a continent and that on the western side it goes nowhere near the pole. This year, especially, water surrounded us on all sides, and stopped our advance in three different directions. A boat or canoe ought to be carried, but it hinders one's advance, so we must risk it without. I believe that the ice Payer saw surrounding the polynia off Cape Fligely was more or less broken-up, disconnected ice, and ice over which sledges could not travel. On reaching the hut the doctor and the others turned out, lighted a fire, got us some food, and the three of us then turned in, being very glad to get out of our damp clothes, and to feel warmer and cleaner than we had done for weeks. Armitage and I had a wash every morning when sledging, and I always stripped to the waist when so engaged, for I prefer to feel a bit chilly for a few moments and know I am clean afterwards, even if it only be a wash in a teacupful of water. I would rather go without a dinner than without my scrub.

We were weighed during the course of the day by the doctor

	<i>March 13th</i>	<i>April 13th</i>
Armitage. . . .	185 lbs. (= 13 st. 3 lbs.)	171 lbs. (= 12 st. 3 lbs.)
Blomkvist . . .	192 lbs. (= 13 st. 10 lbs.)	187 lbs. (= 13 st. 5 lbs.)
F. G. Jackson . .	189 lbs. (= 13 st. 7 lbs.)	181½ lbs. (= 12 st. 13½ lbs.)

Armitage lost a stone, Blomkvist five pounds, and I seven and a half pounds. Both Armitage and Blomkvist still complain of rheumatic pains.

* Since writing this I learned from Nansen that Rawlinson Sound does not exist at all.

AT CAPE FLORA

It has been blowing from a fresh to a strong gale, with thickly driving snow, all day, and has opened up a long lane of water off Cape Flora. The sea off here, with the exception of occasional open pools, had been closed for many weeks, and this is the first northerly wind of any force and duration since February 19th, which is a very unusual state of things. Such a spring as this in this latitude, I should say, is unprecedented. I learned on getting back that "Tommy Rot" had been killed by a bear a few days previously. He had received one bite across the back. The bear had abstained from dining off him, apparently not relishing dog-meat, although he carried an empty stomach, and had gone off on to the floe, where he was shortly afterwards shot by the doctor. He had apparently caught the dog on the stable-roof, which, in consequence of drifted snow, is nearly level with the surrounding snow-covered ground. He had killed the dog, as far as could be seen, from sheer mischief or savagery.

April 14th, Thursday.—I took negatives of the sledges, unloaded them, and stowed the gear away in No. 1 canvas hut. The others were engaged in various jobs. The doctor went on getting the blubber off one of the bear-skins. Armitage and I took a solar observation for time after lunch. I had the dogs fastened to the square formed of spars outside the dog-house, as it is more healthy for them there now than in the kennel. They did very well on their pound of meat per day each while sledging.

April 15th, Wednesday.—Snowing, overcast, and misty all day, with winds from force 2 to 4 from W.N.W. and easterly till 5 p.m., when it went into the northeast and very rapidly woke up into a strong to full gale, with furious continuous gusts, up to force 11, with intensely thick-driving snow. Why it can now blow hard from a northerly direction with plenty of open water up there, whereas for two months it has been unable to accomplish it, is strange. After meeting with such an extent of open water up north we naturally attributed the warm weather and the prevalence of southerly winds to its presence; but here is a hard gale from the northeast with all the previous conditions unchanged. The more one sees of this part of the world less sure one is about anything.

The temperature at 8 p.m. had fallen to 5.5° below zero from $+11^{\circ}$ at noon. This fall of temperature, I afterwards learned from Nansen, froze up a portion of the water which stopped us,

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and allowed him and Johansen to round Capes McClintock and Richthofen.

I occupied myself in drying things brought back from the sledge journey and in washing some clothes. The doctor went on with the bear-skins in No. 2; Armitage worked out the observations taken for "time" yesterday, and in again working out the observations by double altitudes for position and variations taken on the journey. I went on developing my quarter-plate negatives taken then. All have turned out well, and I have managed to hit off the exposure pretty accurately. Very important ones, namely, the face of a glacier close to Cape Richthofen, which I ascended to view the open water and to take bearings, and show perpendicular striations of dirt, have come out well.

April 16th, Thursday.—Armitage again worked out the observations taken on April 6th for position, by reduction to the meridian, to check it against the same worked out by double altitude.

Double altitude (Sumner's method): Latitude, $80^{\circ} 30' 15.76''$ N.; longitude, $1^{\circ} 27.06' 28''$ E. of Cape Flora.

By reduction to the meridian: Latitude, $80^{\circ} 29' 56.67''$ N.; longitude, $1^{\circ} 27' 41.55''$ E. of Cape Flora.

Variation, $15^{\circ} 45' 11''$ E.

Mean: Latitude, $80^{\circ} 30.06' 21''$ N.; longitude, $1^{\circ} 27' 23.91''$ E. of Cape Flora.

Cape Flora (our hut) being considered as $0^{\circ} 00' 00''$.

April 18th, Saturday.—The hut has got into a fearfully dirty condition, and the felt and cocoanut matting, from smoke and dust from the stove and filth brought in upon boots, are coated with dirt. Being a fine day, Fisher and I set to work to clean everything out. We pulled up the well-worn felt and matting and beat them outside, and thoroughly cleansed the floor, getting into every nook and corner with soap and water and plenty of elbow-grease. Armitage, helped by Child, took a lunar longitude about noon. In the afternoon I turned to and cleaned my cabin, which had got much smoke and dust begrimed. It is quite impossible to keep things clean in the hut, what with dam smoke, and dust, but the "spring cleaning" has made some improvement.

April 20th, Monday.—I went through the dead-reckoning of the

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spring sledging of 1895 with Armitage, checking that of this spring and bearings I took then. I find that there is $18\frac{1}{2}^{\circ}$ of local deviation on the bearings I took on the summit of Cape Richthofen, pulling the needle to the westward. The rocks are all basaltic apparently, and doubtless contain magnetic oxide of iron. I was fortunately able to check these bearings with known positions fixed by our astronomical observations, and also owing to the wonderful clearness of the atmosphere on the 27th of March, and probably also refraction, was able to see and get a bearing of Mabel and Bell Islands, which are also accurately fixed.

Child repaired the stovepipe, which has again burned through. The doctor went on with the bear-skins.

I went up the talus about 6 P.M. There is not much open water to be seen off Cape Flora now, but all the ice is in a very loose condition, with lanes frozen over with very young bay ice.

The sun is causing the snow to evaporate rapidly. A few looms are now upon the upper tiers of rocks, but are quite out of gunshot, as none are yet upon the lower ones. This is a remarkable change in the weather after what we have had for the two last months, and there appears to be no reason for it, as the conditions of open water, north and here, are still the same so far as we know, unless a great part of the open water to the north of us has been filled up with drift-ice quite recently or frozen over. The recent northerly gale may have brought ice down and filled up what was then open water. The fall in temperature looks rather like it.

April 22d, Wednesday.—Hearing about 6.30 P.M. that an ivory-gull with dark markings, similar to the young ones I shot last autumn, was flying about near No. 2 hut, I took a shot-gun and succeeded in bagging it for a specimen. I should have expected that the young of last season would by now have put on their adult plumage, but such is not the case. The young "burgies" appear to change theirs before putting in an appearance in the following spring, or at all events nearly the whole of the brown has disappeared; but in the case of this gull it was still in its first season's plumage.

April 24th, Friday.—Anything I am not absolutely sure of I am omitting entirely from the map. Better have nothing than have it wrong. It is an extremely difficult country to survey, owing to the constant mists, refraction, the abominable climate

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generally, and also to the fact that some of the basaltic rocks, of which the whole of this country, so far as we have seen, consists, are magnetic, and cause local deviation of the compass. For instance, on Cape Richthofen the needle was affected to the extent of $18\frac{1}{2}^{\circ}$ deviation to the left. There is nothing visible in these basaltic rocks to indicate whether they have the magnetic oxide of iron in them or not, and, as a rule, it is only by checking the bearings upon a position fixed by astronomical observation that the error can be discovered, and often this is impossible. One has to avoid the proximity of rocks as much as possible in taking angles.

April 27th, Monday.—At 12.45 A.M., just as I was turning into my blankets, "Nimrod" began to yell "Bear!" I got my hand camera and .303 rifle, and went outside the house to try and get a few snap-shots at him as he approached. I was successful in doing this, and got twelve negatives; a few of these are fairly good but some of them are rather fuzzy, as he proved a bad sitter and would not remain still long enough. I took the last three after he had approached within ten to fifteen yards of me, and as he then showed a decided intention of "going for" "Nimrod," who was chained up close by me, I thought it was time to stop him. I gave him a bullet in the chest which passed through his lungs. This, however, did not knock him out, but he wheeled round, and Armitage, who was waiting in the entrance to the hut out of sight, gave him one in the rump, which broke his near hind-leg; I followed up with one in the shoulder, which broke it and smashed his backbone, giving him his quietus. I then photographed him again, and Blomkvist, who had turned out, Armitage, and I managed to sledge him into No. 2 canvas hut, where we covered him up with furs to keep him from freezing. Child very goodly naturedly turned out to develop the negatives I had just taken, as we were all anxious to see how they looked—some are very fair, but I hope to get better, which I shall do with a brighter light. After breakfast the doctor and Armitage skinned the bear. I refilled my camera, and then photographed some ivory gulls that were feeding on some meat near No. 2 hut. After lunch I took my gun and climbed up the talus, cutting steps in the hard snow and ice, to shoot a few looms for the pot. I succeeded in killing ten looms and one dovekie, which will be a pleasant change from bear's-meat. To-day is the first day that any

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number of birds have been noticed on the rocks, although a few have been on the higher cliffs for some nine or ten days. Dovekies and roches appeared first of all. Kittiwakes are up there in considerable numbers. The first flock of these birds was seen yesterday. A flock of twenty snow-buntings were seen to-day, being the first noticed this spring. (They appeared on this date last year also.) We are glad to see them again; they are nice little birds, and quite the robins of the north.

The wind has been from N.N.E. and E.N.E. (force 1 to 4), a



SNOW-BUNTING (HEN)

LITTLE AUK

SNOW-BUNTING (COCK)

cloudless sunny sky, with considerable visibility and 24° of frost; in fact, one of those pleasant sunny days so rare up here.

The bear shot early this morning was a medium-sized old he-bear, only 7 ft. $4\frac{1}{2}$ in. from nose to tail along the belly. His teeth were much discolored and broken. There was nothing in his stomach, and he was very thin. When approaching he circled round to come up under the wind from leeward, and marched up with considerable boldness, and without any actual hesitation, although as usual he wished to convey the impression to "Nimrod" and me that he had no interest whatever in us,

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although at the same time keeping a sharp business eye open, looking out of the corner of his eyelids upon our movements. I got one negative which very well illustrates the nonchalant demeanor of a bear when stalking his prey. These negatives I believe are unique.

I could see no open water from the top of the talus, but only a few cracks.

April 28th, Tuesday.—Since returning from the sledging the pony has had preserved potatoes mixed with her oats, in place of the dried vegetables, of which we are running short. After eating them twice, she refused to touch them again. I am now trying a little dried vegetables mixed with potatoes to tempt her. The dried vegetables make excellent horse-food if mixed with oats or hay. I wish I had more of them; she prefers the potatoes to oats, eating the one before the other. They are, however, rather binding and must be used with care. "Brownie" returned from sledging looking as well after her hard work and rough ride as she did when she left.

May 3d, Sunday.—After dinner we got the sledges ready to start to Cape Gertrude to fetch drift-wood for firing. We are now using the remaining burning material left in cinders that have already been put into the stove three times! This mixed with our little remaining coal-dust makes a substitute for better fuel, but is constantly going out. There is not much more drift-wood to be found, so unless the ship gets back this summer we shall have to rely upon blubber alone.

The others amused themselves as they liked all day; they seemed to enjoy their day off on Sundays. Water was seen in the hollow of a flat rock to-day where the sun had melted the snow on the stone. It is like the first swallow of summer. From the top of the talus this evening no open water was to be seen or even a water sky. I have not seen such an absence of all water here for a long time.

May 6th, Wednesday.—After breakfast we again set out to Cape Gertrude to fetch drift-wood, and brought back the box of geological specimens left last July, as there was no means of carrying it then. A strong southeast wind faced us, with a temperature of 4° above zero. About noon it changed to east by north, and then back to southeast, the temperature falling to $\frac{1}{2}^{\circ}$ above zero. I fear the thermometer keeping so low at this time of the year,

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With a southeasterly wind, indicates a great quantity of ice and little open water in that direction. We got back to the hut about 30 P.M.

The sky, cloudy at first, nearly cleared entirely later, but again clouded over in the evening.

Child let in an iron plate on the ground lintel of the door, where the wood had been carelessly hacked away in clearing ice.



SLEDGING DRIFT-WOOD. CAPE FLORA IN THE DISTANCE

The usual four played whist in the evening. I never play, because I am not devoted to cards; they bore me.

May 7th, Thursday.—To day we fetched the last of the drift-wood, having cleared Cape Gertrude. We have sledged in all about two tons. We also brought away a very odd jaw-bone of whale-bone whale and some ribs.

We got back to the hut about 5 30 P.M. The jaw-bone was on a beach about ten feet above the present sea-level, and about fifty yards from the sea. The ribs were about twenty feet above the present level, and three hundred yards from the water's edge.

All the drift-wood collected is of very old date apparently, and some bore evidence of having been in the water a consider-

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able time before being washed up. One piece, about five feet long by four inches broad, had the appearance of having been trimmed on one side, and a letter A was cut upon it, but it was of considerable age. It appears to be pine and birch. I am having sections made of the wood, which Fisher is undertaking to be examined and reported upon at home.

May 13th, Wednesday.—I began a tracing of the map I have recently been plotting out.

About 1 P.M. Armitage and I took our guns and went up the talus on the east side to kill a few birds for the pot. I am keeping off the front of Cape Flora, as I am afraid of scaring the looms away by shooting there before they settle down to nesting. I shot ten looms, a dovekie, and eleven rotches.

May 16th, Saturday.—Finished my map and began inking in my surveying-journal. The doctor worked at the bear-skins, Fisher went on with his botanical work, Child recapped cartridge-cases, and Armitage wrote up his astronomical observations.

After tea the doctor and I went up the east talus. Shot twelve looms and twelve rotches. I had rather a nasty slip when trying to secure a winged bird upon a steep ice-gull. My foot slipped, and I slid about eighty yards down an ice-slope of 45° at a great rate; and only partly checked my pace by throwing my gun into the hard icy snow, but I was going so fast that the gun was wrenched out of my hands. A low rounded bow nearly level with the snow, over which I passed, then put a break on me a bit, and, at all events, enabled me to get a grip with my hands and stop myself. I, fortunately, was able to stay fairly clear of jagged bits of rock, and landed all serene near the bottom of the talus.

The winds have been from W. and W.N.W. (force 1 to 2), with more or less overcast sky and mist.

May 21st, Thursday.—The sun is causing the snow to melt rapidly now, and puddles of water were standing this afternoon at the foot of the talus near Mouat's grave on the exposed soil.

I wonder if the *Windward* will get back this year. It is nearly two years since we heard news of any kind from the world!

When the ship returns I intend to take advantage of the open water, and take her north as far as possible. A lot of good work can be done with a ship here—dredging and sounding in the

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fjords, botanical, geological, and other work, in addition to geographical discovery.

May 25th, Monday.—Thick, small rain was falling at 12.20 A.M. Yesterday, when walking across the fresh-water pond, I noticed that the ice is rapidly getting thin, and would hardly bear my weight. There is no sign of thaw on the surface, and it is ap-



PLATEAU OF CAPE FLORA IN MAY, FROM AN ALTITUDE OF 300 FEET

parent that the ice is decaying through the action of the warm water underneath. The bottom of the pond is doubtless heated by the sun's rays passing through the ice, and the water and ice above it are warmed by the radiation of heat from the bottom. The pond is not more than twenty inches deep anywhere. By temperatures taken recently we find that the water of the thaw-water pools is generally from 5° to 8° warmer than the air when the sun has been shining, even after 7 P.M., when the pools have been thrown into shade by the high cliffs of Cape Flora.

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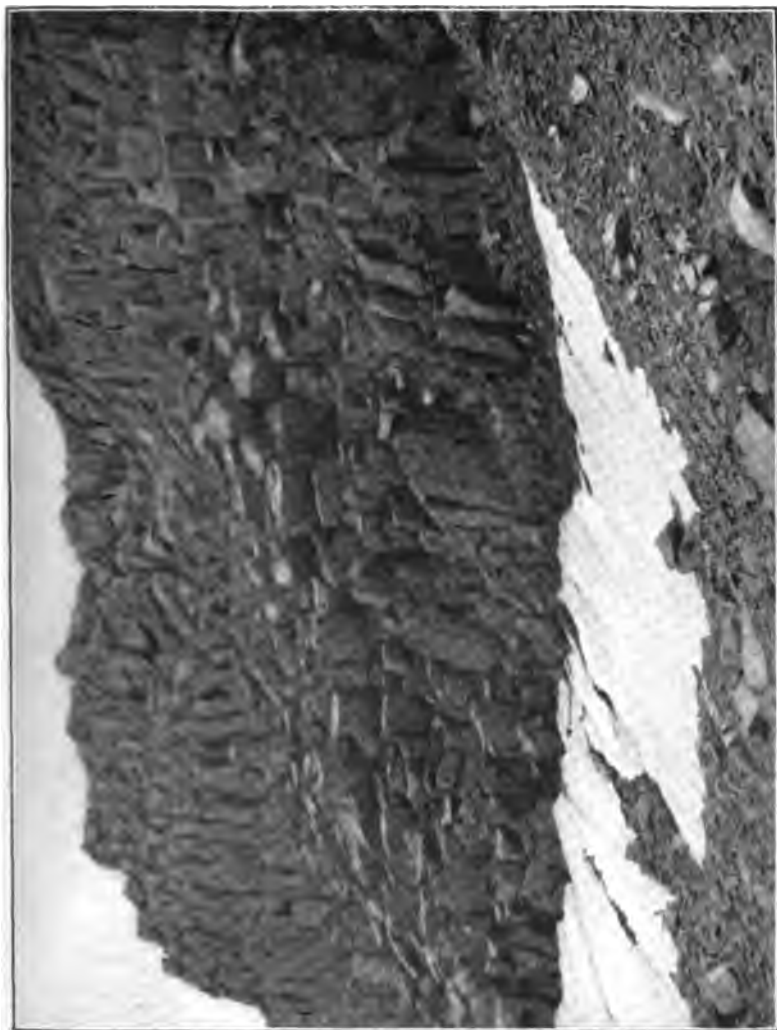
The rain continued until about 2.30 P.M. in a steady, fine drizzle, with the wind east and east-by-south; on changing to west-by-north, with light airs, it ceased. It has been overcast and misty all day.

During the morning Blomkvist and I nailed strips of painted canvas upon the roof of the hut, as the wet is again beginning to run through into the room below.

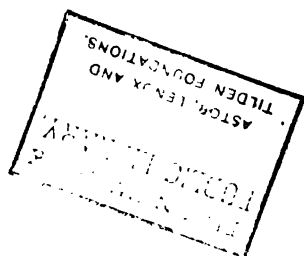
After lunch I looked up all that remain of our long sea-boots—we can no longer use fur ones—and with some trouble managed to supply all the party but myself with a new pair, as every one has worn out the ones they had last summer. Some don't fit as comfortably as they might, I fear. I must make my old ones do until the ship comes, when I expect more by her.

Fisher went on with his botanical sketches, Child reloaded cartridges for me, Armitage wrote up the astronomical observations, the doctor worked at the bear-skins in No. 2.

After lunch the doctor came to tell me that he had found at the foot of the steep slope below No. 1 hut the body of the bear which I had severely wounded with the shot that, after leaving his body, had finished poor old "Räwing" on February 1st. The rapid thaw of the last day or two had melted away the snow-drift which must have quickly formed over him then. I had sent Child with my rifle, while I was attending to "Räwing," to see if he was lying there, a few minutes after I had fired at him, and he returned saying that he could find no bear. So it must have got buried very rapidly, or sufficiently so to escape detection on a dark winter's night. The bear turns out to be a young (small) he-bear, and had only managed to struggle to the edge of the steep slope, a distance of twenty yards or less from where I fired at him, and had then rolled down the slope and become covered with snow. We dragged him into No. 2 hut to thaw, as he is still frozen hard. My shot had taken him in the chest on the right side, and had passed through the body and out again on the left side, cutting through the diaphragm, liver, and stomach, and letting the contents of the latter (loose skins which he had picked up near No. 1) into the thoracic as well as the abdominal cavity. The bullet then cut the bowels in several places, and escaped behind the last rib on the left side. The bowels protruded both at the entrance and at the exit wound. Part of my .450 bullet was found in the wound. The position of the wounds proved beyond



BROKEN BASALTIC COLUMNS, TWO TIERS ABOVE THE TUFA, MIXED WITH BROWN SHALE, AT THE WESTERN
END OF THE CLIFFS OF CAPE FLORA



AT CAPE FLORA

doubt that the bullet, after leaving the bear's body, had hit the ground before coming in contact with "Räwing"; in fact, must have ricocheted some distance. This was the only wound found upon him.

May 27th, Wednesday.—I shot a small bird, with a flight somewhat like the sand-piper, but a shade larger, with a black beak three-quarters of an inch long, black and white head, black breast, and white abdomen; a few white feathers between the back and the tail; some of the feathers are black-edged and tipped with chocolate, others are black-edged and tipped with white. The legs are red with dark marks and the feet are likewise, unwebbed. I believe it to be a turnstone. It is the first bird of this kind yet seen here.

A bird having much the flight and appearance of a swallow, so much so that the resemblance struck both Blomkvist and me simultaneously, appeared this evening. I fired a long shot at it flying, and believe it fell near the flag-staff, but hours of search among the bowlders there failed to find it. It was probably a swallow driven here by a gale. This is not, however, very remarkable.

May 28th, Thursday.—After breakfast, when looking out of the window, I saw fly over the hut a bird dissimilar to any I have seen before here. I at once went out with my gun, but it had disappeared. Thinking it might have gone west, I walked about two miles west, searching some pools of thaw-water near the glacier, and carefully looking over all the ground. On the edge of one of the thaw-water pools I found a drake eider-duck, which I succeeded in shooting; it is the third killed in Franz-Josef Land by us.

About 6 P.M. the doctor and I walked east with guns to continue my search of this morning, but without success. I killed a purple sand-piper. This is the first seen this year. After dinner a small bird was noticed by Fisher, about the size of a hedge-sparrow, a white breast and orange or buff throat, dark-brown back, with a short beak. I at once went to look for it with my gun, but it had disappeared and could not be found. It was probably a Lapland bunting. The arrival of birds this year which were not seen at all last summer is remarkable.

May 30th, Saturday.—The country now looks very winterly again from the heavy fall of snow and drop in temperature.

A THOUSAND DAYS IN THE ARCTIC

I took a walk with my gun before dinner to look for new birds away east, but did not see any.

The doctor tells me that the left lower jaw of the bear I shot in Markham Sound has either been broken or the bone very much enlarged through inflammation. The canine tooth on that side has been broken, and has a decayed cavity in it, and the tooth next to it is broken also. He was a young bear.

Our cook succeeded in gaffing Fisher again to-day (for the second time) with the barbed portion of a "People's button," a box of which I had been weak enough to give him. This was served up in the bread. Some time back, when a similar thing occurred, I made him return the box to me, but one barbed portion was then missing—it has turned up in poor Fisher's gum! He was very indignant. It stuck firmly in his gum between the teeth. Our cook explains that it must have come off his coat. He evidently has a roll in the dough before he puts it in the oven, to judge by his usual appearance. He frequently serves up such luxuries as cinders, coal, blubber, pieces of wood, nails, etc., with the food. Fish-hooks (which the barbs of these buttons resemble) are again in season! It causes great amusement and jokes at his expense. But his work is not play by any means, and he does very well, poor fellow. We are always glad of an excuse for a laugh.

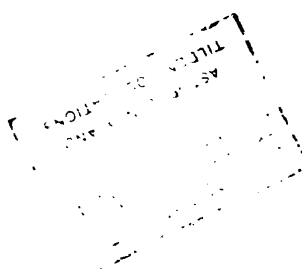
June 1st, Monday.—After breakfast I skinned the bear I shot on February 1st, which only this morning has become sufficiently thawed to enable this to be done, and the doctor gave me a hand. He and Blomkvist went on with the walrus and the bear-skins. Although only partially thawed, the carcass smelled very high indeed, and the doctor had to put the skin into pickle overnight to prevent it going entirely wrong. After lunch I did some writing until dinner-time, and in the evening washed some clothes and mended up my leather jacket. Fisher worked at his botanical specimens with the microscope, Child did various odd jobs, Armitage wrote up the meteorological observations.

It has been a most unpleasant, wintry day, although the first of summer.

June 3d, Wednesday.—About noon, accompanied by the doctor, I went out, taking my gun, to look for any new birds that might have put in an appearance. We ascended Cape Flora (altitude, about 1400 ft.) by the glacier, and got a splendid view. The sea



MR. F. J. CHILD



AT CAPE FLORA

to the southward is very much encumbered with very close ice, and only a long, narrow lane of water a quarter of a mile wide, at the edge of the land floe, and reaching east and west as far as the eye can see, is visible. To the northward I could see no open water, although one or two dark patches near Windward Island look a good deal like it. I unfortunately had no compass with me, so I was unable to take bearings, but I could clearly make out the round of the glacier near Peterhead, Koettlitz Island, the Rubini Rock, Scott Keltie Island, and the coast of Hooker Island in that neighborhood. I intend to ascend the cape again on the first clear day and take a camera with me, and also a prismatic compass to take bearings. A moderate gale from N.N.W. was blowing on the top, with a considerably lower temperature than below. (A moderate to fresh wind only was blowing on the beach below.) The snow was quite dry and crisp on the top. We got back to the hut about 4 P.M.

I saw a flock of eight brent-geese to-night, the first seen this year.

June 10th, Wednesday.—After tea the doctor and I walked east. I shot a Lapland bunting—a bird smaller than the snow-bunting—with a yellow beak tipped with black, black head and breast, with white marks running into the black behind the head to the nostrils, a ruddy, rusty mark on the back of the neck, white abdomen, and a brown speckled back; the feet and legs are brown, with a nail half an inch long on the rear toe—a handsome little bird. We saw six brent-geese, but after several attempts to stalk them, and although I wounded two with long shots, we failed to bag any—they are very wary.

After dinner I washed some clothes. About 11 P.M. Heyward and Blomkvist came in to say that they had seen a similar small bird to the one I had shot before dinner and also some geese. Taking Blomkvist with me to show me the spot, I started off with my gun, and succeeded in bagging the other one, another cock Lapland bunting, but the geese were not at home.

The *Windward* should be on her way here now. We are all looking forward intensely to news of the world by her, having heard none whatever for two years. And yet we are almost afraid to hear news. It cannot all be good.

June 11th, Thursday.—Armitage came in to report having seen three new birds near Sharpe's Rock. I, accompanied by the doctor, started out to look for them. I found them to be Lapland

A THOUSAND DAYS IN THE ARCTIC

buntings ; they are very wary now, but I succeeded in killing one to add to our specimens.

Blomkvist is not looking very well, and is a bit anæmic. I can't give him any change of food, as he, in common with all of us, is having the best of everything obtainable here. It looks ugly, however, for next winter. I lent him a gun this evening, and went for a good walk with him. He succeeded in killing two geese, which has elated him very much and will do him good. We must keep them for some special occasion, such as a birthday.

The "burgie" which we got at Cape Stephen last August, and had kept in the hut all winter, died this morning. Its cage had been fixed to the front of the hut on the south side yesterday, and apparently the change was too much for it after being inside for so long.

It is the middle of June now, almost two years since we left home comfort and civilization. Two years since we felt the clasp of a friend's hand ; two years since we heard anything of the outer world upon which we so completely turned our backs. Probably now the *Windward* is coming north, bearing us news—good news, let us hope, of those dearest to us. And to our joy we shall, I trust, get books and newspapers and something to read at last. Two years is a long time to be without any refreshing stimulus from the outside world. The longing for a new face is great at times, the ears strain for a new sound ; but, week in week out, our lives remain distressingly the same. Fortunately we are always busy, and are never idle. In fact, we never seem to have sufficient time to do all we want to.

June 17th, Wednesday.—I went up the talus directly after breakfast and collected a quantity of scurvy-grass, sufficient for lunch and dinner. I then went on with my writing and nautical astronomy.

After lunch Blomkvist and I took a short ladder up to the top of the talus, and I looked into several kittiwakes' nests which are just finished. Saw no looms' eggs on the ledges, so I mean to wait for a few days before trying again. I afterwards went through the walrus heads and skins with the doctor. I found one bear-skin on the top of a cask inclined to go wrong, so we set to work to make brine to cover them, as apparently salt alone is not sufficient.

Fisher went on with his botany. Armitage wrote up the meteorological observations.

CHAPTER XXV

A MAN ON THE ICE!

Just after dinner Armitage came rushing in to tell me that through his field-glass he could see a man on the floe to the S.S.E. of Cape Flora, about four miles off.* I could hardly believe it, such a thing seemed utterly impossible, and thought he had mistaken a walrus on the ice for a man; but having got a glass I could see he was correct. I could also make out somewhat indistinctly a staff or mast, with another man apparently standing near it close to the water's edge. It occurred then to me that it might be one of my own men, although they had all been at dinner a few minutes before, but I, however, found that all were present. I got a gun with all speed, and firing off a shot on the bank to endeavor to arrest the stranger's attention, I started off to meet him coming across the ice, having placed Armitage on the roof of the hut to direct my course, as the high hummocky ice hid him from me when I got down upon the floe. On nearer approach I shouted to him and waved my cap. I thought at first that some accident had happened to the *Windward*, which had started earlier than I expected, and that this man had come off in a boat from her to communicate with us.

On our approaching each other, about three miles distant from the land, I saw a tall man on ski with roughly made clothes, and an old felt hat on his head. He was covered with oil and grease, and black from head to foot. I at once concluded from his wearing ski that he was no English sailor, but that he must be a man from some Norwegian walrus sloop who had come to grief, and wintered somewhere on Franz-Josef Land in very rough circumstances.

* I have given the account of my meeting with Nansen word for word from my journal.

A THOUSAND DAYS IN THE ARCTIC

His hair was very long and dirty, his complexion appeared to be fair, but dirt prevented me from being sure on the point, and his beard was straggly and dirty also.

We shook hands heartily, and I expressed the greatest pleasure at seeing him. I inquired if he had a ship. "No," he replied "my ship is not here"—rather sadly I thought—and then he remarked, in reply to my question, that he had only one companion who was at the floe edge.

It then struck me that his features, in spite of the black grease and long hair and beard, resembled Nansen, whom I had met once in London before he started in 1893, and I exclaimed :

"Aren't you Nansen?"

To which he replied :

"Yes, I am Nansen."

With much heartiness I shook him warmly by the hand and said :

"By Jove, I'm d——d glad to see you," and congratulated him on his safe arrival. Then I inquired :

"Where have you come from?"

He gave me a brief sketch of what had occurred, and replied "I left the *Fram* in 84° north latitude and 102° east longitude after drifting for two years, and I reached the $86^{\circ} 15'$ parallel and have now come here."

"I congratulate you most heartily," I answered ; "you have made a deuced good trip of it, and I am awfully glad to be the first person to congratulate you." Again we shook hands.

He then gave me a brief sketch of what had occurred. He had passed close to the New Siberian Islands ; had entered the ice about the 80° north, had drifted for two years in a north west direction to the 84° north and 102° east longitude. He had then left the ship with Lieutenant Johansen (who was taking care of two kayaks at the floe edge) and a team of dogs in March 1895. They had pushed north as far as $86^{\circ} 15'$ north latitude 90° east longitude, and then judged it advisable to return and try to reach Spitzbergen *via* Franz-Josef Land. How they had passed the previous winter on the land a little to the south of our farthest point north, reached in the spring of 1895, on an island in Cecil Rhodes Fjord (named by me). There they made a small hut of stones and walrus-skins, near the entrance to Gora

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Booth Ford,* and had come south down the British Channel and De Bruyne Sound, and round Cape Barents, and had been lying at the floe edge off here for two days.

I replied, "I congratulate you most heartily. You have made a jolly good trip of it, and I am awfully glad to be the first person to congratulate you," followed by a good deal more hand-shaking.

I fancied by what he had said that the *Fram* was at the bottom, and that he and Lieutenant Johansen were the sole sur-



THE MEETING BETWEEN JACKSON AND NANSEN

vivors. I consequently abstained from asking any further questions about the ship, and gave my fellows a hint later not to do so, as I feared to hurt his feelings. It was not till nearly an hour had elapsed that from some remark he made I gathered that the *Fram* was all right, and that he expected her to be on her way to Norway. Owing to discrepancies in Payer's map he could not make out where he was, and they had let their watches run down, consequently could not get their longitude and tell their position.

* Named by me after Sir Henry Gore-Booth.

A THOUSAND DAYS IN THE ARCTIC

For two days they had been lying at the floe edge repairing their kayaks before we saw them.

Nansen had fancied he heard dogs barking and two gun-shots yesterday (I had fired about twenty shots at looms near the top of the talus of Cape Flora), but he had come to the conclusion that they were only noises made by the ice. He was uncertain as to the date. Finding themselves on the 80° north latitude they were pushing west, knowing that by so doing on that parallel they might hit Spitzbergen, where they hoped to fall in with a walrus sloop. After hearing the noises I have mentioned Nansen thought he might be in the neighborhood of Eira Fjord, and that I might be there, as he knew something of my plan of going to Franz-Josef Land, so he set off to walk to the nearest point to get upon an elevation to have a look round.

His first question was in reference to his wife, and his son, as to the politics of Norway and, "Were Norway and Sweden at war?" He was going gamely, but looks pale and anæmic and very fat.

On approaching our hut I told him again how delighted I was to be the first to congratulate him and welcome him on his turn. Nearing the hut all my party came forward on to the beach to meet us, and I introduced them all to Nansen and told him that he had come from the $86^{\circ} 15'$ north latitude, and called out three cheers for him, which was responded to most vigorously. This seemed to please him, and he repeatedly said: "That is splendid!"

I then sent Armitage on to tell Heyward to cook some food for once, and heat the bath-water—of course I did my utmost to make him and Johansen comfortable.

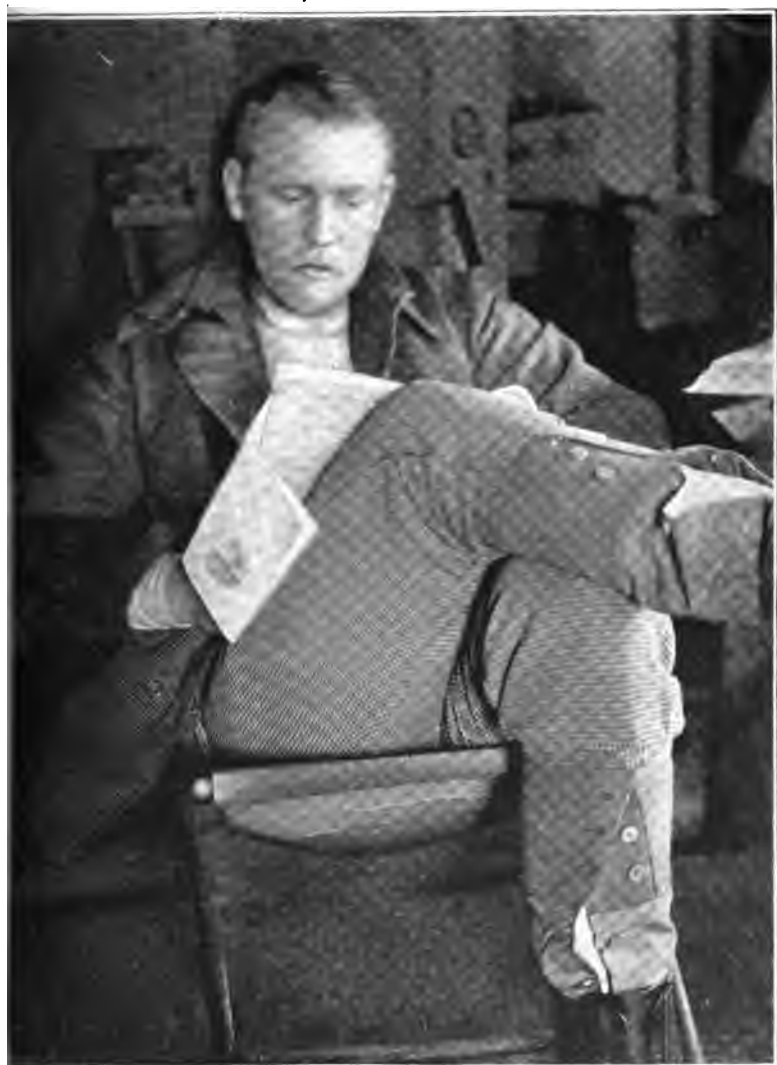
On entering the hut I handed him a packet of letters I had brought from London for him. There was no letter from his wife, at which he was very downcast, and I had again to assure him that she was very well when we left London in 1894, but a letter from his brother explained matters. He then had some fried looms, rice-pudding, and jam, and any little luxuries we could supply. (He and Johansen had lived almost entirely on bear and walrus meat for the last nine or ten months.) He afterwards had a bath, and I found him a change of clean clothes. I had sent all the party, except Heyward, with two sledges to bring up Johansen and the kayaks, and on his coming



NANSEN AS HE ARRIVED AT CAPE FLORA

1937
1938

1939
1940



NANSEN AFTER HIS WASH AND BRUSH-UP

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A MAN ON THE ICE!

up I looked after him in the same manner as I had Nansen. Johansen was, if possible, in a dirtier condition than his leader, and was as black as a sweep with dirt and grease.

Contrary to Dr. Nansen's experience, our sense of smell must have become considerably *lessened* by long absence from civilization, for, strain our noses as we may, we fail to discover the slightest trace of the "Monkey (or any other known) Brand" about our distinguished visitors from the North.

Johansen is a short, sturdy, muscular little chap, and looks as fit and well as he might have done had he just come off a yachting trip. He hasn't turned a hair, but looks the picture of health. He is a capital fellow. Nansen and I, on meeting, had fired four shots in quick succession to let Johansen know he had met some one.

My fellows, on approaching Johansen and seeing the Norwegian flag hoisted to the mast of a kayak, had given three cheers. Johansen told one of the party in German that they were "lost" and did not know where they were, which is hardly surprising, for they had no means of ascertaining their whereabouts, as Payer's map north was unrecognizable, and they could not get their longitude owing to their watches having run down. They had a lump or two of evil-looking walrus-meat and two or three draggled-looking looms in their kayaks, which was all the food they had with them, poor chaps. On the night of Nansen's arrival we sat up talking till 8 A.M. of the following day, and then turned into our blankets, but we soon turned out again and renewed our conversation for hours. He said "he did not want to sleep, he felt so happy." I feel very pleased.

A more remarkable meeting than ours was never heard of. Nansen did not know I was in Franz-Josef Land, as I did not leave England until a year after he started on his expedition, and I had not the smallest idea he was then within hundreds of miles of me; in addition to that, Nansen was very uncertain indeed as to what part of the world he was in.

In the spring of 1895 I was within three or four miles of the spot where he passed the winter of 1896, and this spring again I was not far off him.

I had his letters in the little tin case with me on both occasions, although I had no real expectation of seeing him, but should have felt much annoyed had I met him sledging and

A THOUSAND DAYS IN THE ARCTIC

had not his letters, consequently I always carried them with me.

Nansen tells me that Peterman Land and King Oscar Land do not exist in his opinion, and that he passed right through where the Dove glacier ($81^{\circ} 30'$) is laid down without seeing land to the north. Wilczek Land trends away to the southeast to the south of his route.

I have given Nansen my cabin and I sleep in the general room, and have put Johansen to sleep alongside of Armitage in his cabin. The doctor camps beside me on the floor of the general room.

I showed Nansen my map, and he pointed out upon it to me where he had spent last winter. He afterwards copied from this map in making his own. He had fancied until just before we met on the ice that this must be some land other than Franz-Josef Land on account of the absence of land marked by Payer. After his thinking he heard two gun-shots and dogs barking he believed he recognized a resemblance of the coast-line around here (Cape Flora) to that on Mr. Smith's map as Bell Island and Eira Harbor, mistaking, however, Cape Flora for Bell Island.

They had fancied sometimes they might be to the northwest of Cape Lofley upon Gillis Land when at their winter quarters, and that Arthur Island was Spitzbergen, and at other times that they were in Austria Sound. When off Cape Barents, finding themselves in the latitude of Spitzbergen, they decided to strike west upon it, knowing that then they must hit it if they could travel far enough to reach it. They hoped to meet walrus sloops in Hinlopin Straits. It was not until they thought they heard dogs and the two shots that they (for a time) thought they might be in the neighborhood of Eira Harbor.

Nansen weighed to-night 205 lbs. (14 st. 9 lbs.), about a stone and a half above his normal weight. He measures about six feet two inches, or an inch taller than I am.

I photographed him on his arrival at the hut, after having a feed, at his request. I told him I expected the *Windward* any day.

June 18th, Thursday.—We had breakfast at 7 P.M. I went up the talus and shot a few looms for dinner, which we cooked with our two geese in Nansen's honor at 3 A.M. on the 19th. I showed him our sledges, furs, etc. He kindly offered to send me out one



USING THE BIRCH-BARK CANOE IN THE WATER-CRACKS

A MAN ON THE ICE!

of his paraffin stoves and some "snow-flake" paraffin oil to burn in it, as he thinks a great deal of it and is anxious for me to try it. This will not thicken with cold. He also wished to leave with me his kayaks and small theodolite, but of course I will not hear of this, as I should be afraid of something happening to them. It is good of him, though. He asked me what he should do about



"NANSEN'S LARDER"

This canvas bag, about the size of a hat-box, was carried by Dr. Nansen on his sledge journey after he left the *Fram*, and contained blubber which he used for "Food, Fuel, and Light" until reaching Franz-Josef Land, when he presented it to me at Cape Flora. This interesting relic now reposes in the library of the Royal Society's Club.

the country I had discovered to the north prior to his reaching Franz-Josef Land, and which he had since passed through. He would have to give a map showing his course; should he leave this blank and say that that will appear in Jackson's map? I said I hardly knew what to reply, but we would talk the matter over later on when we had had time to think about it. It is very decent of him to think of it: some would have published that portion of the map without consulting me—at all events, all they knew of it.

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Nansen, helped by Child, developed one or two of his negatives, which he feared might have been damaged by salt water when a walrus knocked a hole in his kayak, but he found them uninjured.

June 19th, Friday.—All the party turned in about 9 A.M., and slept all day, except Nansen, Dr. Koettlitz, and I. We sat up for forty-eight hours at a stretch talking. We had sundry scratch meals of our own making, and the time passed quickly and pleasantly. How we enjoyed the exchange of new ideas, to see new faces, especially with people with whom we have so much in common, and with whom we have such hearty feelings of sympathy! We finally turned into our blankets at about 10 P.M.

On hearing the full details of Nansen's journey, it strikes me forcibly that great luck has attended his daring exploit, especially in hitting upon a spot for wintering near constant open water both summer and winter, and consequently with plenty of game in the neighborhood. Providence alone brought him to such a spot, failing which the end of his expedition, so far as he and Johansen were concerned, would have been very different had he missed meeting with us—and what a marvellous meeting that was! He could not have left Franz-Josef Land; for the extension of that country towards Spitzbergen is quite unlike what Nansen and every one else believed it to be, and a stretch of practically open sea of more than a hundred and sixty miles in extent (as we found it to be in 1897) lying between Cape Mary Harmsworth and the nearest known land—White Island or Cape Leigh Smith—cannot be crossed in leaky canvas canoes. I consider a retreat by way of Novaya Zemlia to be infinitely preferable, and Nansen and I have numberless arguments upon this point without either party changing his opinion.

I think, however, it is possible that Nansen and Johansen with their great resource and hardihood might have weathered out another winter upon Franz-Josef Land had their ammunition held out—say, upon Cape Neale, the most westerly point where an existence could have been maintained—where we should have found them, if alive, in the following spring.

I feel the greatest satisfaction at being the means of saving these brave fellows further perils and of sending them safely home. I only trust that Dr. Nansen's extraordinary immunity from penalty will not lead the inexperienced to suppose that they

A MAN ON THE ICE!

may go larking about within the polar circle with merely a dog and a gun, and that all things will be well with them. If they should fall into this error they will be sadly—I almost said fatally—deceived.

June 20th, Saturday.—I went up the talus after breakfast and shot twelve looms, and with Fisher's help got scurvy-grass for lunch and dinner.

I was about with Nansen all day, showing him anything I could to interest him and comparing notes. Fisher went on with his botany, etc., the doctor worked at the walrus heads, and I got the bear-skin out of No. 3 hut for him to get the blubber off, and did various small jobs. Armitage and Lieutenant Johansen cleaned up Nansen's instruments, and Blomkvist tried to wash his and Johansen's clothes by putting them into water with caustic soda to begin with. They are in a fearful condition.

June 21st, Sunday.—Nansen and I went for a walk after we had breakfast, and we discussed plans for reaching the south pole. I strongly advised the use of northern Russian horses, and describing the best method of handling and camping them out.

He gave me a pressing invitation to visit him in Norway and go elk-shooting with him. Our tastes as to sport agree entirely.

Fisher took temperatures of the soil and pond water, etc.

The weather has been cold, misty, and overcast all day, and a good deal of ice has come in from the east with the easterly wind of last night, and Nansen remarked that he could not have proceeded on his way towards Spitzbergen with so much ice about.

Every one amused himself as he liked.

June 22d, Monday.—Yesterday I told Nansen that he might publish my map if he wishes to, as his route goes through the country which I had discovered a year previous to his passing through it. I am also going to offer to allow him to name the land I discovered in 1895 north of Cape McClintock, which is in the neighborhood of his winter hut, as he has discovered very little to name, and I think it hard lines on the chap if he cannot name the capes and fjords in the neighborhood of his hut, where he passed a winter under such hardships and privations, which until he met me he had imagined to be his own discoveries: I shall have plenty to name without these. I suggested this to him, and he replied: "This is not the right thing, I know;" to which

A THOUSAND DAYS IN THE ARCTIC

I answered: "I can't see that it matters, as it is a thing that only concerns you and me." He thanked me for being so kind, and said he would "consider whether he could accept my generous offer." I have offered him the naming of everything he could see from his winter quarters.

I did various odd jobs in the morning, and after lunch went up the talus and killed ten looms for dinner, and cleaned Nansen's guns for him afterwards.

June 23d, Tuesday.—After breakfast Nansen and I went up the talus and shot twenty-one looms. He is a good shot.

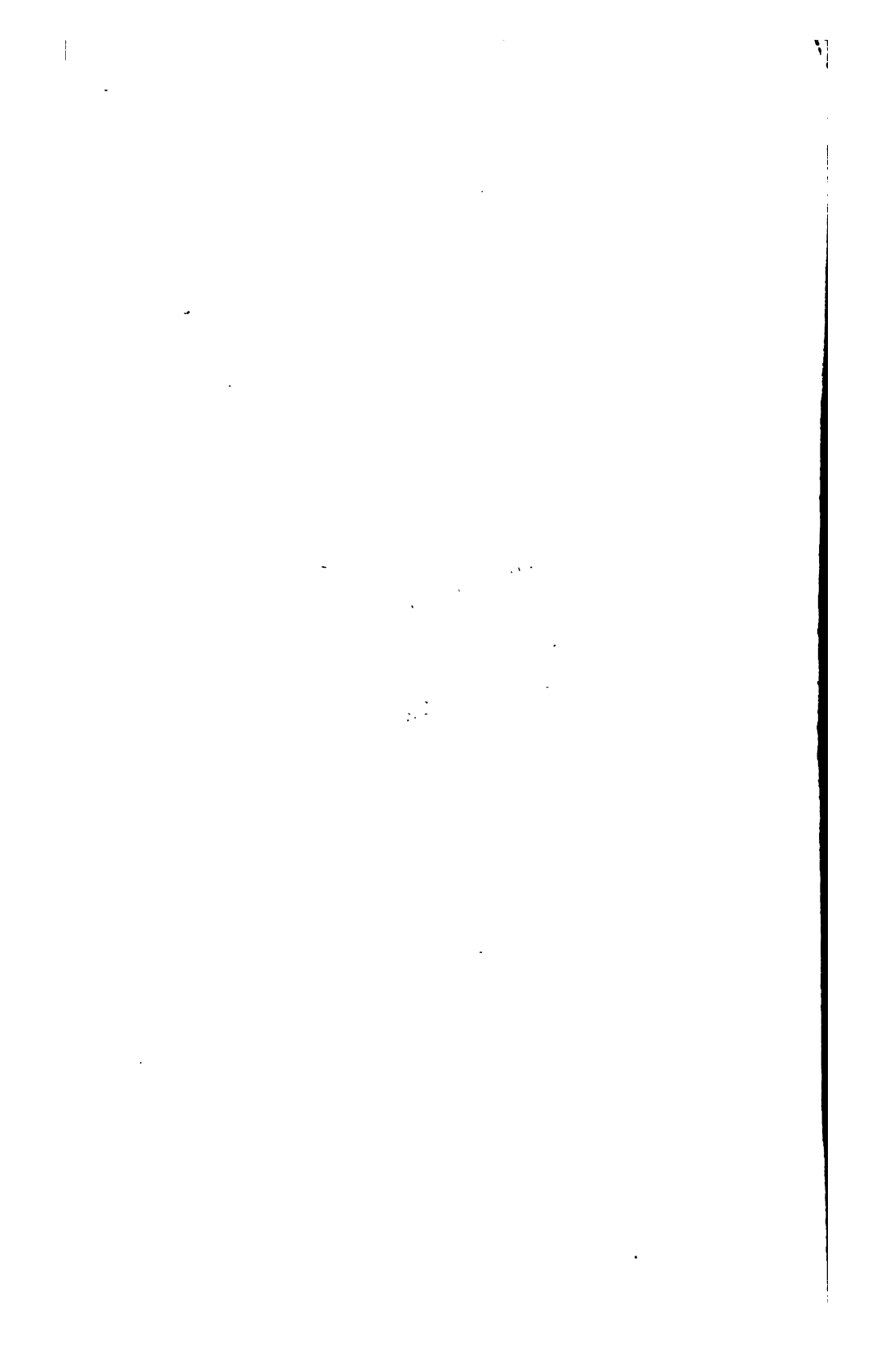
After lunch, hearing that a seal had been seen in one of the cracks off the shore, Armitage and I went to try and shoot it, but it had disappeared. We fired a few shots at a mark afterwards.

June 24th, Wednesday.—After breakfast I got the birch-bark canoe out of the stable store to thaw the ice out of it.

I sent the doctor with Lieutenant Johansen up the talus to enable him to have a little sport loom-shooting, as he seems fond of it. Blomkvist and I went up the rocks to get eggs. We succeeded in collecting seventeen looms' eggs and twenty-seven kittiwakes'. We did not return until 6 P.M. We found the rocks very loose, which rendered climbing rather dangerous. Herward, who had gone to fetch water about 8 P.M., returned to the hut somewhat in a hurry, saying that he had met a bear on the top of the slope which had run towards him. I asked Nansen if he cared for a shot, and giving him my rifle and I taking my camera we started out. I went ahead, and our friend at first came towards me hissing loudly, but evidently thinking discretion the better part of valor beat a retreat. I got one negative, and then as she seemed like going off, Nansen wounded her in the hind-quarters and checked progress. I then ran up and took one negative after another, but as she made two or three vicious rushes at me, Nansen thought it was time to put a break on her enterprise, so popped another bullet through her left shoulder, cracking the bone. I then ran up close to her, as she stood hissing and snapping, and took more negatives, with the dogs barking around her. I sent for my revolver and fired two bullets into her muzzle, aiming at her head, which only had the effect of enraging her still more, and seizing "Misere" in her teeth, she threw him over her head, and caught "Nimrod" by the right fore foot and tore a nasty gash in it. As I could see that using a re-



CLIMBING THE ROCKS OF CAPE FLORA IN SEARCH OF LOONS' EGGS



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volver upon her was simply torturing her, I asked Nansen to finish her with the rifle, which he did. We then sledged her up to No. 2 hut to be flensed. She was a fair-sized she-bear. I sent this skin to Mrs. Nansen by her husband.

June 25th, Thursday.—After breakfast Nansen and I did a little photography. He took two or three negatives of me in the hut, and I returned the compliment by photographing him.

After lunch Blomkvist and I went up the talus to get more eggs, accompanied by Nansen, who wished to take some negatives of birds on their nests. We took a second short ladder to lash to the first to increase the length. Nansen returned to the hut with a negative or two, which I took for him from the top of the ladder. Blomkvist and I secured eighty-eight kittiwakes' and four looms' eggs, getting back about eight o'clock.

June 27th, Saturday.—Nansen and I walked out to our meeting-place on the floe to the S.S.E. to be photographed at the scene of our extraordinary meeting on June 17th. Nansen re-dressed himself exactly as he was on that occasion, and in every way the scene was exactly reproduced, excepting that his hair and beard had been cut, and he was in a more cleanly condition. I put on my brown leather coat, breeches, high leather boots, and round woollen cap, and carrying my gun as upon that occasion. "Misere," the dog that went out with me then, was also included in the group. We got back about 6 P.M. Nansen and I took a number of photographs on the way.

Johansen seems a splendid little chap, but I don't speak Norwegian, unfortunately, and his English is rather embryonic at present. He is studying hard at it.

June 28th, Sunday.—After breakfast I traced in a map made in 1795. Nansen went on with his observations.

Armitage, the doctor, and Fisher went on ski to Cape Gertrude. They saw there two divers, probably the red-throated variety, but failed to get a shot at them. They returned at 11 P.M.

After lunch Nansen and I went up the talus and shot seventeen looms.

Nansen appears to be very anæmic and out of condition. Three years in the Arctic has evidently taken the vigor out of him for the time. Climbing the talus pumps him very much, and he doesn't like it a bit. He has had, poor chap, a very rough

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time of it, especially during the last fifteen months, and all the care, responsibility, and worry which falls to the lot of a leader of an Arctic expedition in addition to it. Johansen certainly looks better, but the latter causes of being out of condition have been absent in his case, as he has had no responsibility.

June 29th, Monday.—During the morning I worked at the maps and Nansen went on with his astronomical observations. Armitage walked through Windy Gully with a rifle. He saw a fox, but could not get within three hundred yards of it. The doctor went geologizing and came across a number of sandstone fossils. These were at the southern end of Windy Gully, on the left-hand side, looking north. It is a high shoulder, about three hundred and fifty feet high, where a small expanse of sandy clay-shale with a few fossils embedded in it can be seen. The sloping surface of the shoulder is strewn with fragments of a hard, gray, fine sandstone, which is red where exposed to the air, and among which were found very good specimens of scriptoriosis of a large belemnite, shells, and other fossils. After lunch I sent the doctor and Fisher to get all the fossils they could, and Nansen accompanied them to see the spot and collected some also. Blomkvist and I went up the talus to get more eggs. I obtained forty-seven looms', three kittiwakes', one rotche's, and two "burgomasters'" eggs. The burgomaster, on my approaching the nest, covered up the eggs with moss. Fisher, a day or two ago, when botanizing, found the nest of a purple sand-piper. It was merely a hollow in the ground in a swampy spot. There were four eggs in it which are very large for the size of the bird ($1\frac{4}{10}$ inch by $1\frac{1}{4}$ inch), olive-green ground marked with chocolate and pale chocolate patches, larger and more numerous at the larger end of the egg. The hen bird showed great anxiety on Fisher's approach, and endeavored to draw him away from the nest by a variety of antics, in the same way as skuas and plovers do. The eggs are somewhat plover-like in shape, but not quite so peg-topped.

From the rocks I could see much ice in the sea, but none to the eastward of any extent, all of a loose description with plenty of water between. I could see nothing to stop a ship's progress in that direction, but it is impossible to say what ice there may be in the sea farther off the land.

July 6th, Monday.—Overcast and misty all day, with winds W.N.W., W., and W. by N. Forces 2 to 3.



NANSEN AT CAPE FLORA

A MAN ON THE ICE!

I did some shovelling in the morning around the hut, and spent the rest of the day writing. Nansen went on with his map, which he is drawing from mine, and I have placed everything unreservedly at his service. He asked me about naming a cape after Armitage, and a rock after Blomkvist, in the large bay in the neighborhood of his hut, as he has accepted my offer to name everything he could see from his winter-quarters.* Should he do this? I told him I thought it very kind of him.

I sent the doctor, with Johansen, up the talus to shoot looms after lunch. They only brought back three, after firing twenty shots, for which the poor doctor got much chaffed. They were evidently a little out of form to-day.

July 7th, Tuesday.—Nansen has been mapping and writing a telegram. I made a tracing of Nansen's map after he had completed it with mine.

July 10th, Friday.—After breakfast, the day being clear, sunny, and little wind, I took my cameras, prismatic compass and stand, and the doctor and I ascended Cape Flora by the glacier to photograph, take angles, and collect anything of interest. I took a number of photographs, made sketches, and took bearings. The view from the summit was a very fine one, showing Capes Grant and Stephen in the distance, with the high, white country behind overrun with ice, and Bell Island and the beautiful little Mabel Island nearer at hand; Bruce Island, covered with its ice-sheet with the exception of a few projecting points of rock near the coast; and Windward Island, now showing a good deal of bare soil and rock. To the northward we could dimly make out the curves of the ice-clad country to the north of Peterhead. Even Koettlitz and Scott Keltie Islands could be discerned.

When returning, upon a nunatak-like projection about six hundred feet above the sea we found a number of plant fossils in crumbling sandstone lying loose upon the surface above the basalt. They appear to contain the leaves of a pine, with some seeds, and in one a cone was visible, also the leaves of a ginkgo,

* On reading Dr. Nansen's book, *Farthest North*, I find he has only availed himself of my offer so far as naming one of these spots—Frederick Jackson Island—after me, which I should never have consented to had I known of his intention to reject the rest. Reading his book was the first intimation I had of this.

A THOUSAND DAYS IN THE ARCTIC

which indicate that they belong to the Jurassic formation, and that Franz-Josef Land once had pine forests and a much warmer climate than to-day. It is difficult to imagine this bleak, ice-covered land once clad with ferns and waving pines, where to-day nothing higher than six inches grows; but such was the case. As Dr. Nansen has described these fossils in his own book, it is needless for me to do so.

July 11th, Saturday.—After breakfast Nansen and Johansen, dressed in their sledging clothes, took their kayaks and sledges



THE CAIRN ON THE SUMMIT OF CAPE FLORA, AND DR. KOETTLITZ

down to a fresh-water lake on the floe, and rigged them as when travelling. I carried down three cameras, and took about fifty negatives of them sailing, paddling, and dragging the kayaks, sledges, etc. This occupied us until 5 P.M., when we had lunch.

July 12th, Sunday.—In the morning I wrote up and packed away a number of negatives and then went for a walk west. The doctor took Nansen to see some geological formations of interest and to collect fossils. I have told my chaps to give Nansen the information and help in their power in every way.

July 15th, Wednesday.—Fisher did some botanizing and found



LEIGH SMITH'S HUT AND PLATEAU TO THE EAST OF OUR HUT IN JULY

A MAN ON THE ICE!

two new fungi and two young purple sand-pipers in the down. It has been overcast and very misty all day, with light and gentle breezes from northwest, N.N.W., and north by west.

July 16th, Thursday.—Nansen handed me his telegram to Scott Keltie to go to a newspaper, and asked me to revise and straighten up the English for him. This I spent the day in doing, as I wrote it all out again, and there were five and a half sheets of foolscap.

July 20th, Monday.—I wrote during the day, and after lunch Nansen and I went up the talus and shot looms. I picked a pet



YOUNG PURPLE SAND-PIPER

“hot corner” on my preserves for his benefit. We shot alternately and killed twenty-eight looms, but might have shot many more. I also got fourteen looms’ eggs off the rocks. The mist cleared when we had finished shooting and gave us a glimpse of the ice. There is a great deal of it in the sea, but it is not very tight and shows a water sky on the horizon. I am getting rather anxious about the ship. Did the *Windward* reach home safely last year, and will she be able to get through the ice and reach us this? I think she will, but time is passing and there is no sign of her. Nansen and Johansen await news by her as anxiously as we do. I hope it may be good news for all of us.

July 21st, Tuesday.—Nansen is an ardent politician, and is al-

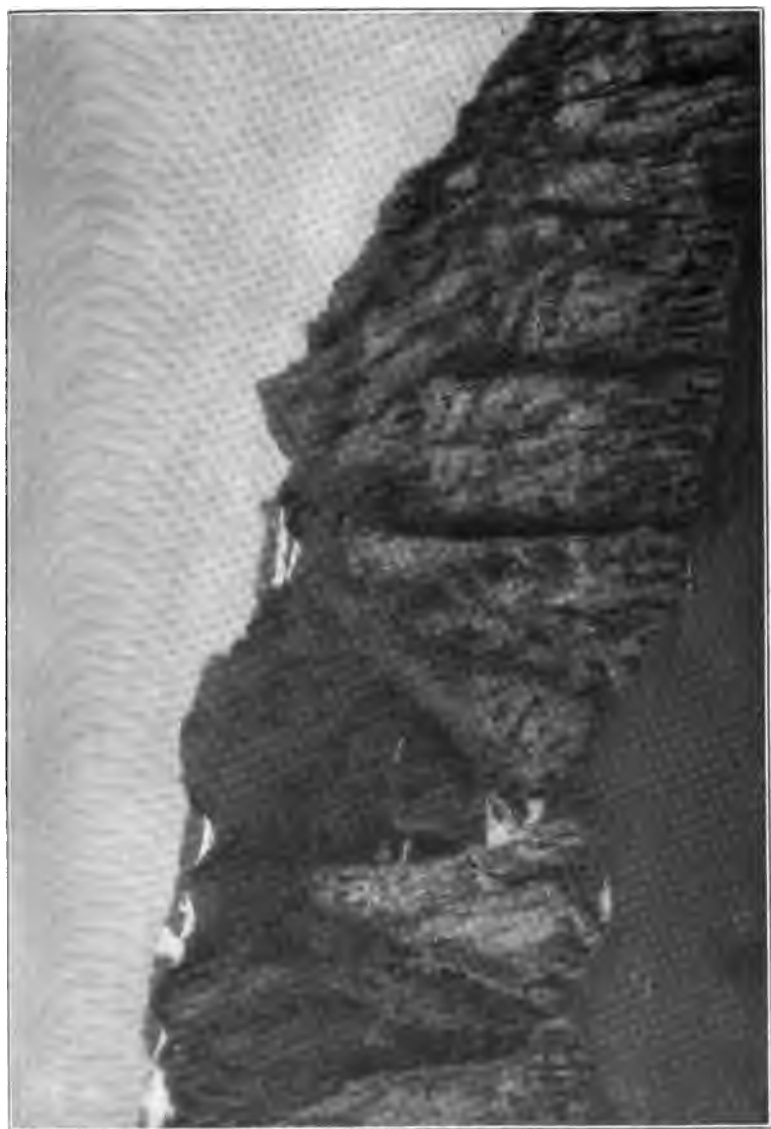
A THOUSAND DAYS IN THE ARCTIC

ways "spoiling" for an argument on politics. I abstained from political discussion as much as possible, as our views on the subject are diametrically opposed to one another. He is, however, very patriotic, and his great desire is the advancement of his country. In this we are at one. Differences of opinion as to methods perhaps matter little. Subjects of her Majesty when at home do not realize how loyal at heart they really are; they have so many objects of interest to daily distract their attention. It is in the loneliness of life, when cut off from all news and communications with the world, and in strange lands, that we really appreciate how much it means to us. So it was with us, and so it is with many thousands of good fellows in far corners of the mighty Empire of which we are all so proud.

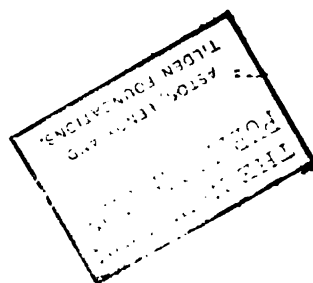
It is by daily intercourse and intimacy with Nansen that the conviction is borne home to me how arduous and heart-breaking was the life he and Johansen endured on that lonely and trying sledge journey.

On the 14th of March, 1895, they left the *Fram*, and on the 17th of June, 1896, we found them on the ice floes off Cape Floer—fifteen months—during which they had travelled about seven hundred miles. It does not sound a terrible undertaking; but to us here, with our experience of Arctic sledging, it appeals with grave significance. Nansen repeatedly remarks that nothing will ever induce him to undertake such a journey again; and I feel with him, and for him, that one such sledging expedition may well suffice for one life-time.

It is summer, but the weather is hardly what in more favorable climes would be considered summer-like. The thermometer hitherto since we arrived in Franz-Josef Land has not risen higher than 8° above freezing-point, and only has attained that degree of warmth on two or three occasions at long intervals. It is misty and raw, and the atmosphere fully charged with moisture. At intervals a drizzling rain has fallen, changing to snow, and towards noon the easterly wind increases in force to a gale with heavy snow. The country is white, and everything looks wintry. This is too frequently the character of "summer" days here. At long intervals the aspect changes. The sun comes out, the sky clears, and the mists roll away for a time. The "cawing" of the looms recalls green meadows and tall elm-trees; and we sit in the sun like crickets upon a wall, and declare that "it is quite



THE LOWER TIER OF ROCKS OF CAPE FLORA



A MAN ON THE ICE!

hot to-day," having quite forgotten what a warm day really is like.

July 24th, Friday.—After breakfast Johansen and I went on ski to the northern end of Windy Gully, as I wished to place the jaw-bone of the whale—fellow to the one we previously sledged to Cape Flora—in position to fetch away next autumn or spring, when the ice is again in condition for it. It lies about three hundred yards from the water's edge, and at an altitude of nine feet above the present sea-level. They belong to the *Balæna mysticetus* or Greenland right-whale, which undoubtedly once lived in these waters. I found several new species of shells on the ice (probably dropped by birds) and on the beach there. The



SUMMER IN FRANZ-JOSEF LAND

ice is in good condition for ski-ing, the snow on the floes having all melted, or the little that remains is now in a coarse, granular condition, over which ski glide easily. The frequent water channels and wide open cracks make jumping often necessary.

Nansen and the doctor went geologizing. Fisher botanized. Armitage is taking a series of magnetic observations. The doctor in the morning packed up and labelled the geological specimens, on which he is spending the utmost care and trouble. Child finished making some hyposulphate of soda for photography, of which we have quite run out.

July 25th, Saturday.—I went up the talus, and climbed about the lower tier of rocks to get a look at the ice off the land. From the S.S.E. to E. there was little ice visible. To the south the ice appears to be of the light, "sailing ice" variety, but from south to west a close pack lay with a few "streams" of water in it; but

A THOUSAND DAYS IN THE ARCTIC

beyond it I could see a "water-sky" on the horizon. No sign of the ship for which we are anxiously looking.

The doctor and Nansen have gone out geologizing, as the doctor wishes to show him a new bed of fossils he has found.

A shoulder projecting from the rocks of Cape Flora about three hundred feet high, composed of the sandstone formation series, shows a section on the southern side in which are white, chalky fossils, possibly belemnites, upon the surface above which,



OLD JAWBONE OF THE *BALÆNA MYSTICETUS*

inclined at an angle of 16° , are strewn numerous pieces of gray sandstone, hard and compact, which has a red surface when exposed to the weather, in which (and also lying loose) are ammonites, belemnites, and other fossils.

Five hundred feet up the talus at the back of the hut is an exposure of the same sandstone series, consisting of clay shales and compact clay sandstone. Down a water-course running from it are many fragments of this clay sandstone, in which are embedded ammonites, belemnites, etc. Above this series is a layer of dolorite of a vesicular, amygdaloidal structure, above which is a small layer or stratum of the clay shale. Upon this is coarse, tuff-like rock; and then come the main basaltic rocks of the cape.

A MAN ON THE ICE!

July 26th, Sunday.—At 4 A.M. Blomkvist, who had stepped outside the house for a moment, woke me and told me that the *Windward* had arrived. News from the world at last! I turned out, and saw her making fast to the floe-edge off Flagstaff Point. I at once told Nansen and called the others, and hurriedly dressing myself, started across the floe on ski towards her, accompanied by Blomkvist. It was then blowing hard from the east, with a heavy fall of rain, and this weather lasted throughout the day until night. Coming across the ice I saw Wilton, whom I had met in Archangel, and a Mr. Bruce, with several sailors. My first questions were in reference to my mother and our friends in England, whom I was told were all well, except Armitage's mother. I then inquired if Frau Nansen and Alexander Nansen (the explorer's wife and brother) were in good health, and on receiving an answer in the affirmative I sent Blomkvist to tell the good news, as I knew the poor chap was anxious about his wife. I wished I could have sent the same good news to my own men, but the sad death of Mrs. Armitage forbade this, and I thought it better to say nothing further at present.

On seeing Captain Brown I was much grieved to hear of the death of Armitage's mother; and it became my duty, the saddest I have had to perform for many a long day, to break it to him. I received and distributed the letters, and we all spent the day reading them. We all had dinner on the *Windward*.

Four reindeer have come, but they cannot be usefully applied to sledging here. They are quite useless to me here.

Owing to the terms upon which Captain Brown and his officers have been engaged (chiefly by bonus on condition of the *Windward* returning by November 15th this autumn), I have been obliged to relinquish my plans for exploring in her. Useful dredging and sounding and other good work might also have been effected had this been made possible. I am pleased to renew my acquaintance with my genial old friend Captain Brown. We had been shipmates together as far as the Yugor Straits in 1893, when I explored Waigatz and the Bolshaia Zemelskija Tundra country, and it was with sincere pleasure that I met him again on the deck of the *Windward* in the far north. For I feel that he is not only a pleasant companion, but a sailor in the true sense of the word, and a man into whose hands the safety of the *Windward* may be fairly intrusted.

A THOUSAND DAYS IN THE ARCTIC

How we all talked! What numberless questions we asked! We heard of the war between China and Japan, the gallant defence and relief of Chitral—where our countrymen exhibited such bravery with Sir George Scott Robertson at their head—of the wondrous X-rays, and color photography, and a hundred and one other things, which more than two years' total absence of news had accumulated. Then our letters and newspapers, too! How



A view of the lower tier of the dolerite rock-mass at the west end of the cliffs of Cape Flora, which is here much broken up in places, being covered with talus, and in others standing out boldly from it. Stratified-looking volcanic mud or tuff, mixed with brown shale, is peculiarly enclosed by dolerite rock.

we devoured their contents! And our hearts were touched by the kind friends who had remembered the absent wanderers, and had sent them a word or two of encouragement and assurance that they were not forgotten. Many useful presents also reached

A MAN ON THE ICE!

s. A musical box from one friend which will delight our ears and recall scenes of home during the darkness of winter; a Christmas pudding and packets of books from others. We heard of friends who have gone, whose kindly faces we never more shall see, and whose hands we have clasped for the last time. Friends whose help and encouragement had come to my aid in my struggle to organize this expedition when encouragement was scanty, and long before Mr. Harmsworth generously came forward to my help with the necessary funds and the expedition became an accomplished fact. The arrival of the *Windward* was a mixed pleasure indeed.

We heard, too, of the difficulties and dangers the *Windward* had gone through on her way home in 1895. How she became stuck in the ice to the south and was locked in its unrelenting grip until the beginning of September, and narrowly escaped losing another winter there.

We heard that to effect her escape it was necessary to burn available timber in the ship as fuel for her engines, to force her clear of the pack; that two deaths occurred on the way home, and much sickness after she left us and before she at last reached Vardo. Captain Brown was most hospitable and anxious to make us comfortable. The little steward, Else, too, in company with every one, in his cheery manner is most obliging and diligent, and tireless in his endeavors to give us the best of everything, and to attend to our comfort generally. Both he and Captain Brown have been very energetic on the voyage in soundings and using the drag-net, and have quite a collection of marine life on board.

July 27th, Monday.—After breakfast I took all of my party down to the ship, and, together with the crew, we set to work to first of all make a track through the rough ice with picks and hovels, and then sledged goods ashore, having first of all brought up to the hut the four useless reindeer which had been sent in place of ponies. We worked at this all day, having lunch on board to save time.

July 28th, Tuesday.—After breakfast I started all the land-party to work, carrying all stores liable to be damaged by wet up the steep slope by the flag-staff to the hut. At this we worked all day. The crew continued sledging goods from the ship, and by night had landed all stores and a good deal of the coal. A

A THOUSAND DAYS IN THE ARCTIC

reindeer died this afternoon. Sending them is a very sad mistake. All my hopes and expectations of receiving ponies have come to naught. People at home have possibly acted for the best, but it is a great disappointment to me, and the omission heaps difficulty upon difficulty. I had been building my hope upon them. I *do* know what I require here.

August 4th, Tuesday.—During the night the *Windward* shifted her moorings and steamed, we believed, up Miers Channel to avoid ice, but the thick weather quite prevents us seeing where she has gone. I have been writing hard all day and have this evening completed everything, and there is now nothing to keep the ship another hour. The doctor has been packing up geological specimens all day. Fisher has kindly set to work to develop some negatives for me, which I wish to send home. Wind E.S.E. force 5 to 6. At 4 P.M. south, force 4. At 8 P.M. south, force 2 to 3. Overcast, misty, three hours snow and one of rain. Snowed all last night, and there is to-day a heavy fall on the ground and deep drifts. It looks quite like winter again.

To-day we have all been working hard, stowing away the stores which have arrived by the *Windward*, the doctor excepted, who has been packing up geological specimens to be sent by the ship, as I wish as many as possible to go. Another reindeer died this afternoon, apparently from the same cause as the last one. It is a great disappointment not to get horses, and these reindeer are worse than useless. I had pointed out the unsuitability of even well-trained reindeer for use in Franz-Josef Land.

There appears to be plenty of open water a short distance from the land floe, but there is a good deal of ice in the entrance to Gunter Sound.

Overcast, misty, and three hours snow. Wind, W.S.W. and W., 6 to 7.

August 6th, Thursday.—I have told Captain Brown that I wish Blomkvist to travel aft, and not to be sent into the fore-castle. I fear he might be if I did not make a point of it. He has asked me to allow him to return home, as he fears his health will not stand a third winter here. He has written me a very nice letter thanking me for my "great kindness to him." I am sorry to lose him, as I have found him a capital fellow, with whom from first to last I have not had an unpleasant word. He has done his duty well and to my entire satisfaction.

A MAN ON THE ICE!

I have been busy at a variety of jobs, and in the afternoon Armitage, Wilton, and I began to carry the bags of coal which had been brought on shore up the icy slope by the flag-staff on to the plateau. But as they weigh over a hundred pounds each, we find it a bit too much of a good thing to carry them up slippery ice at an angle of 45° , so we haul them up with a line attached to a 9 ft. 6 in. sledge, hand over hand, and in this way get on better.

It has been blowing W.N.W., force 3 to 6, until 6 P.M., when it became northwest-by-west, force 3. Overcast, misty all day, with two hours snow. At midnight the *Windward*, which had been obliged to leave the floe owing to the southerly on-shore wind, came a little nearer to us and was tied up to the floe beyond the west point. It is remarkable that a southerly wind of force 6 should have come on to blow while she was here, for a wind of that force from that direction is very uncommon (only once before has it reached force 5). This brought a good deal of ice in, and obliged her to leave the floe edge and finally forced her up Gunter Sound, where it has blocked her in with only two feet of water under her keel. I feel very anxious about her. If she had a little more steam-power she would not remain there an hour longer than she wished to, but she steams slower this year than in 1894, and won't do more than three knots. Nansen does not appear to wish to go on to Christiania in the *Windward*, but to land at Vardo and take one of the mail steamers on. I have told him I only wish to consult his convenience, and of course he can do as he wishes.

I have requested Captain Brown to wire Harmsworth for permission to take the *Windward* on to Christiania, and having received his permission to offer to take Nansen there, and then be guided by his wishes entirely.

August 7th, Friday.—About 12.45 A.M. the *Windward* could be seen pushing her way among the ice and proceeding down Gunter Sound near the coast of Mabel Island. As she came nearer us we took all the geological specimens (five cases) the doctor could get packed, together with the baggage belonging to Fisher, Nansen, and Johansen, and proceeded to sledge them across the now very rotten land floe towards the water's edge. Fisher is returning, as his term of engagement (two years) is now up, and he has practically finished the botany here. He has worked

A THOUSAND DAYS IN THE ARCTIC

most enthusiastically and hard, not only at this, his special department, but at the zoology or anything that came to hand. He has made valuable collections and sketches of minute life. I am sorry to lose him.

A boat put off from the *Windward*, but landed too far west where the distance was much greater and the ice much too rough to take a heavily loaded sledge over. Nansen, Johansen and the doctor managed to reach the boat with her crew, intending to pull round the point and meet the sledge there. The



"AND PROCEEDED TO SLEDGE THEM ACROSS THE NOW VERY ROTTEN LAND FLOE TOWARDS THE WATER'S EDGE"

came down fast, however, from Miers Channel and drove fast east along the floe edge, cutting the boat off from us. The doctor managed to return over the driving pack after a rather risky and troublesome walk. Nansen and Johansen also started back to say good-bye to me, but had to return to the ship. Nansen, Johansen, and I have been capital friends, and I part from them with regret. About 6 P.M. slack tide came on, and a lane of water opened through the pack leading to the land floe; we again ran out our sledge, and were met at the water's edge by the mate and a boat's crew with a whale-boat, and put the specimens

A MAN ON THE ICE!

ails, and baggage on board. Nansen has offered to send my wire to Mr. Harmsworth from Vardo, and, as I wish to avoid any possibility of clashing with his telegrams, I have handed it to him to do so. He prefers, he tells me, to send his cable first to Mr. Scott Keltie and then mine to Mr. Harmsworth, and after that a longer wire of his own to Keltie. Three of the crew, including the cook, have applied to me to allow them to join my expedition and to remain here. However, I have no need of further men, and had to decline their services.



"AND PUT THE SPECIMENS, MAILS, AND BAGGAGE ON BOARD"

The ship left about 6.30 A.M. with repeated cheers both from the ship and the boat's crew, and responding cheers from ourselves on the ice. I sent a present of pipes for the ship's company by the mate. They have worked well, and have been most obliging and nice. We regretfully watched her slowly depart, and wished that we had finished our work and could go with her. This will take another two years, as I intend, after completely mapping Franz-Josef Land, to try a shot over the floes to attain as high a northern latitude as I can to the west of Nansen's route, as that is part of my original plan.

A THOUSAND DAYS IN THE ARCTIC

I can see very little ice off the land. About 8 A.M. we could just see the ship bearing S.S.E. from Cape Flora under sail with a gentle N.N.W. wind. The sky had cleared then eight-tenths, and there was no mist to seaward. She should make a good voyage, I think, as there is apparently slack ice to the south.

We had a little food and turned into our blankets until 3 P.M. I then set to work to thoroughly clean out the hut and to straighten things up generally.

Wilton has to carry his arm in a sling, having poisoned his hand



THE WINDWARD LEAVES US FOR THE SOUTH

on the way here, but is able to feed the animals and do light jobs. We have only had breakfast and dinner to-day, so as to enable us to get level with the day again. Although the sun circles round the heavens all the twenty-four hours still without setting, yet, owing to its low altitude after 6 P.M., and the high rocks of Cape Flora to the north placing us in the shade, the thermometer generally falls below freezing-point during the night. We get so little warmth here that we are anxious to benefit by all there is, and on that account avoid as much as we can turning night into day, although our invariable tendency is to do so. We frequently find

A MAN ON THE ICE!

ourselves having breakfast at four o'clock in the afternoon, lunch at 10 P.M., and dinner at 4 A.M. of the following day, owing to having worked all through the previous night, much like the weird creature referred to in *The Hunting of the Snark*. We then by sitting up for twenty-four hours contrive to get right again with the day, but we soon get day and night topsy-turvy again.

CHAPTER XXVI

THE DARKNESS OF A THIRD WINTER IS UPON US

August 8, 1896, Saturday.—After sweeping out the house, as usual I went up the talus and shot eighty-one looms for the winter larder. Heyward and Wilton came up later in the day to help me carry them down. These we hang up to a rope stretched round the roof of the hut, where they freeze at once.

August 9th, Sunday.—After doing our usual domestic work I went up the talus, accompanied by Armitage, Wilton, and the doctor to pick up the birds as I knocked them over, and shot one hundred and twenty-eight looms. I could see only a little drift-ice in the offing.

August 10th, Monday.—Another reindeer died this morning of no very apparent cause. I took a rifle to shoot the remaining one to save it for the larder, but as it appears to be in better health and stronger than the others, I abstained, and have decided to give it every chance. I expect it will die soon, however. Nothing but reindeer that have been brought up from fawns to eat artificial food, less bulky and more nutritious than their natural lichen, and accustomed to being penned up, as I had experienced before I started on this expedition, are of any service. These animals, I believe, are pining to death. They are young animals which have never been in a sledge, and are as wild as hawks. I cannot carry the lichen sent by the ship when sledging, especially drenched as it is with water and frozen solid, and it is impossible to dry it here. This lichen having got musty, they won't eat it readily, but waste fifty per cent. of it. After we had done our usual morning's work I went up the talus and killed a hundred and nineteen looms. I was accompanied by Armitage and Heyward, Wilton following later to help to pick up the birds and to put them into sacks as I shot them. It was snowing all the time we were up there.

THE DARKNESS OF A THIRD WINTER

August 11th, Tuesday.—Wilton's hand is better, but it hampers him in doing work, although he is very willing, and would soon have it very bad again if I allowed him to do all he is anxious to.

I have arranged with Armitage to take a weekly series of magnetic observations through the winter, and also to take daily



LOOMS ON THE ROCKS

the magnetic declination. Without a copper oil-stove to warm the observatory, owing to the freezing of moisture on the instruments, accurate observations are carried on under the greatest difficulties. Unfortunately, a stove for this purpose was omitted to be sent by the ship this summer. Armitage has been able to get a small copper Norwegian lamp which he hopes to be able to make answer the purpose.

A THOUSAND DAYS IN THE ARCTIC

August 14th, Friday.—After "sweeping up" I went with Armitage and hauled out our two small boats, which we had put into the water to swell the timbers, as they were being rapidly frozen in. I then went up the talus with Armitage, Wilton, and the doctor, and shot one hundred and twenty-eight looms. The doctor killed one of the sheep, which had been put on board at Vardo. I felt very reluctant to have this done, as they are such nice friendly animals, following one about and have become pets with all of us; but necessity obliges, as I want the hay for the pony.

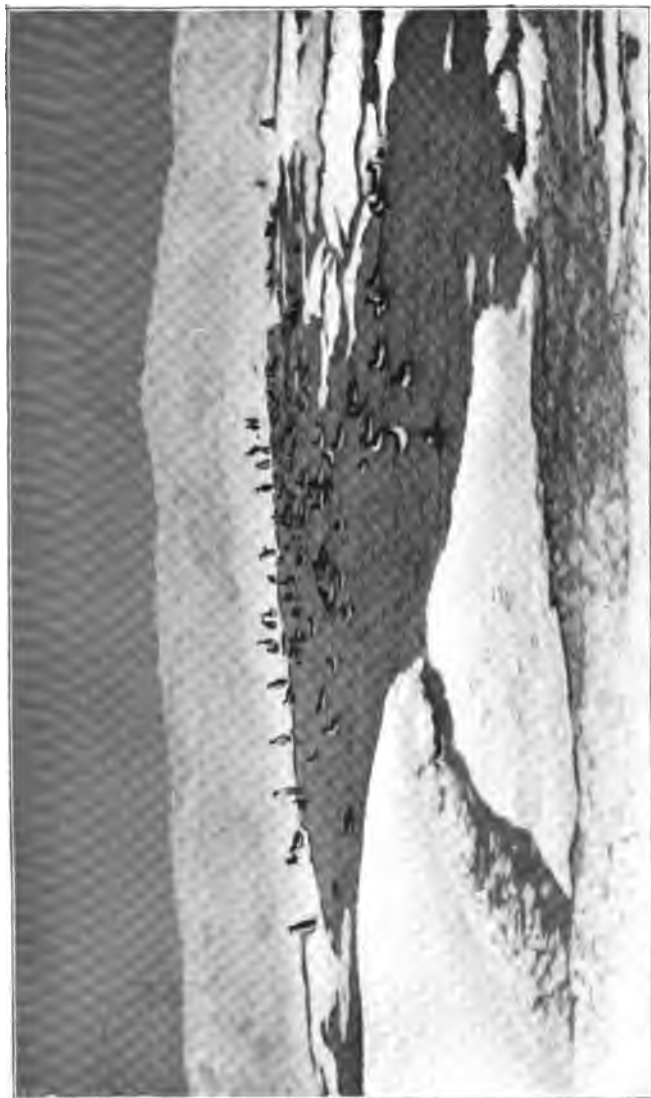


HAULING COAL UP THE ICE-SLOPE

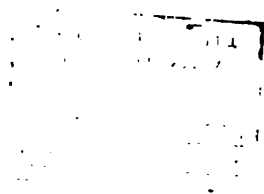
After tea we hauled more coal up the slope. The sacks of coal we find very troublesome to handle owing to their excessive weight (coal in bags to be landed at such spots as this ought not to exceed fifty-six pounds each).

A packing-case (no contents marked upon it) turned up to-day, containing the tubes of the Thompson sounding-machine on board the ship. It was labelled "Land Party." Many articles expected have not come.

August 17th, Monday.—After breakfast we set to work to remove the old felt and to clear out the dust and dirt, and then lay down the thick felt with the new oil-cloth over it. Unfortunately, only half as much as is required has been sent to cover the



LOOMS AND YOUNG IN A WATER-HOLE IN THE ICE-FLOES



THE DARKNESS OF A THIRD WINTER

whole floor, but we are using tin cut out of old meat-cans for carpeting to make up deficiencies. Armitage and Wilton rigged another block and tackle to haul coal up the ice-slope by the lag-staff.

August 24th, Monday.—Some lines for fish and a large tin with meat as a bait for shrimp and other water life were set to-day. However, at midnight only a few shrimps were caught.

August 25th, Tuesday.—After breakfast Wilton and I took my anoe and sledge and went across the floe to the pools of water.



LOOM-SHOOTING WITH BIRCH-BARK CANOE

I shot eighty old looms and twenty young ones, and captured a number of young ones alive, which I brought back to be labelled, as it will be very interesting if these are captured south or killed elsewhere. We cut out a small copper label with a J stamped upon it, and tied it to the young looms' legs; afterwards they were put into the sea so as to give them a fair start. The copper label was attached with very strong fishing-line to nineteen of them.*

Armitage fixed a new line round the hut to hang birds on for the winter, as the old one has given way twice.

* Up to going to press none of these have been heard of (December, 1898).

A THOUSAND DAYS IN THE ARCTIC



"ON GOING ROUND THE REINDEER-HOUSE I CAME UPON THE BEAR"

August 26th, Wednesday.—About 8.30 A.M., hearing the dog barking, I sent Heyward out to ascertain the cause. He returned reporting a large bear near the reindeer-hut. I took my hand camera and rifle, Armitage following me. On going round the reindeer-house I came upon the bear suddenly, eight yards off, and got a very satisfactory snap-shot at him with the camera, for



"AS HE HAD GOT A TRIFLE TOO NEAR TO BE QUITE PLEASANT"

THE DARKNESS OF A THIRD WINTER

did not notice me, as he was looking at a dog that was yapping at him. On his discovering me through the click made by the camera, he came at a rapid rate towards me, manifesting distinctly malicious intentions towards the aggressive photographer, and had approached within three and a half yards of me before I could get another hurried snap at him with the camera, when, as he had got a trifle too near to be quite pleasant, I backed a couple of yards to where I had placed my rifle on the ground, and stopped his farther advances with a bullet in the head which knocked him over. He, however, managed to half raise himself and scramble



"AND STOPPED HIS FARTHER ADVANCES WITH A BULLET IN THE HEAD"

towards the bank which has a steep descent to the sea. Fearing he might slide down it and thus give us trouble in hauling him up again, I asked Armitage, who had come up, to stop him. His bullet, however, did not appear to influence him much, so I gave him another in the neck which finished him. He was a tall, leggy bear, but, to our surprise, only measured 6 ft. 9½ in. from the nose to the root of the tail along the back. He looked much larger. The second negative, taken at three and a half yards distance, is a trifle "fuzzy," owing to the hurried way in which it was taken, and the bear is partly out of the field, owing to my having to judge it. He was a trifle too near to enable me to take my eye

A THOUSAND DAYS IN THE ARCTIC

off him and to look into the "finder" of the camera. I just got his head and back in.

The doctor and Wilton skinned him after breakfast.

Wilton managed to catch a snowy owl, which was evidently very sick—due to a charge of shot, I think—this evening. We have put it into a rough cage, hoping that it may recover.

Winds N.N.W., N., and E.S.E., force 1 and 2. Sky clouded from $\frac{1}{10}$ ths to $\frac{6}{10}$ ths.

August 27th, Thursday.—One bear seems to bring others! Armitage came in just before we sat down to breakfast to say



THE PHOTOGRAPHER PHOTOGRAPHED. A SNAP-SHOT BY MR. ARMITAGE

that a large one was feeding on the blubber of a walrus I shot yesterday. I took the half-plate camera (as he showed a strong objection to leaving his find of food, and I thought he would prove a good sitter), my hand-camera, and rifle, and called the others to follow me to see the fun. When I got out he had left the blubber, having eaten as much as he could cram down, and was lying at some distance from it, evidently with the intention of camping until his stomach would admit of its taking in a little more. It was amusing to watch his anger when the ivory-

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gulls ventured to help themselves to a little of "his" meat, and every time they settled near to it he at once chased them off. I took a number of negatives of him with the telephoto lens at a distance of sixty yards or so, when Armitage took a snap at me with my hand-camera while so engaged; and then, taking my hand-camera, I went down on to the floe, followed by the others. He at once came angrily towards me, evidently thinking I intended to take his blubber from him, and I took one negative after another at about seven yards distance, as he stopped at a crack and stood hissing and snarling at me, and gave me a splendid opportunity of photographing him. After exhausting all my films I called the others up, and we gave him a volley which finished him up, poor old chap. It seemed rather too bad to shoot him after the amusement he had afforded us. He had been lying about on the ice, looking for all the world like a drunken man after a feast, and was much the shape of Andree's balloon. His stomach was enormously distended, and the contents ran out of the œsophagus on its being cut near the root of the tongue in removing the skin. The contents weighed sixty-five pounds. In spite of this, he several times tried to get more down, and was exceedingly angry with any bird that attempted to get a picking. He measured 7 ft. 7½ in. from the nose to the root of the tail.

After this bear entertainment we had breakfast (2 A.M.), and I spent the rest of the day developing the negatives; the others skinned the bear and sledged the meat up to the floe-berg, to be added to our larder on the roof by-and-by. It has been calm all day, with nine-tenths of the sky clouded.

August 28th, Friday.—After breakfast, as it was calm and sunny, I took a number of negatives. Wilton and I then went up the talus, and I took several more with the half-plate and hand-camera of birds upon the cliffs, and then with a ladder and landing-net caught seventeen kittiwakes (three were old birds and the rest were young ones), to the legs of which I attached copper labels (J), and a strip of red cotton to the neck to attract attention if seen in Europe or elsewhere.

Armitage fitted up the whale-boat ready for dredging to-morrow if the ice and weather are suitable, to obtain specimens of marine life.

August 30th, Sunday.—After doing a few odd jobs, I set to

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work to remove the shelves, pictures, etc., in my cabin, and to calk the walls, and then put a covering of the thick, loose felt and another of tarred, from our new stores, under the green felt, in the hopes of remedying the wet condition the room has been chronically in by making it warmer. This took me until 9 P.M.

Wilton walked to the northern end of Windy Gully to look at the lines and trap, but nothing except a few shrimps were taken. The others amused themselves as they liked.



SNOWY OWL

September 2d, Wednesday.—Soon after breakfast I spotted a bear on the floe which had been feeding on the blubber of the walrus I shot a week ago. I took my rifle and camera and called to Armitage to follow me. I went along the beach past Eira Cottage, as the bear was sauntering along east, and finally heading her off, got near enough to take some negatives. I continued taking them whenever opportunity offered, and at last she came towards me hissing and showing every inclination to charge; but, unfortunately, the click of my camera in changing the film made her alter her mind and she made off. She kept her hind-quarters directly towards me, and I allowed her to go some distance in the hope she would show her flank, but as she still kept

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dead ahead I shot at her backbone a little above the tail and succeeded in breaking the spinal column and knocking her over. Armitage then shot her through the right thigh. After again taking a snap at her with the camera, as she sat on her hind-quarters hissing and snarling at me, I finished her with a shot in the neck. It was curious to see her, when crossing thin ice, scramble along upon her stomach, spreading her weight over a greater surface to prevent her going through.

We then took ten of the dogs and a sledge out, and having skinned her, brought the skin and meat up to the hut, ferrying



"I FINISHED HER WITH A SHOT IN THE NECK"

the dogs, men, sledge, and meat over the lane of water in the twelve-foot Norwegian boat, which we carried down the steep slope for the purpose.

September 3d, Thursday.—I mended my hand-camera after breakfast, as I discovered that, owing to the wood having shrunk near the "finders," it was admitting light, and this accounts for the fogging of negatives taken with it recently, which had much puzzled me.

We then all set to work to haul coal up the ice-slope, and stacked the bags of reindeer moss, which has become frozen down upon the ice-foot.

Winds N.N.W., W.N.W., and N.W., force 1 to 4. Sky clouded $\frac{1}{8}$ ths to $\frac{1}{2}$ ths. Rain band 0.5. Fine snow falling at times after noon.

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September 4th, Friday.—After breakfast I set to work to make a wheelbarrow, using the trahometer wheel for the purpose (which is now useless for measuring distance, as a recording instrument for it has not arrived by the *Windward*).

Bruce went on with the zoological work, with which I am helping him in every way in my power.

September 5th, Saturday.—The doctor this morning is suffering from what he believes to be ptomaine poisoning, and I am also feeling distinctly chippy. His face is much swollen and rather inflamed, and he is anything but well. This we believe to be caused by one of Heyward's many cooking eccentricities, probably due to his using a tin of tainted sardines for his "sardine



"WE THEN TOOK TEN OF THE DOGS AND A SLEDGE OUT"

fritters" made yesterday (a dish fit for the infernal regions of fast days). I have given him orders to bring all tins of meat, before being opened, for the doctor's or my inspection as usual before using them, about which necessary precaution there has been a little slackness lately, owing to the ship's arrival and our being very busy. Poor Heyward does very well with the cooking of the whole, and his billet of catering for the appetites of six hun-

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gry men is no sinecure. He is very plucky and anxious to please.

As neither of us feel particularly in form for coal hauling, I put it off until Monday.

September 6th, Sunday.—The doctor and I are still feeling very cheap. I found the small boat to-day Leigh Smith left on the



DREDGING IN OUR WHALE-BOAT FOR MARINE LIFE

bank by the flag-staff. The top of the gunwale is projecting out of the ice of the floe-berg, all the rest is buried under and frozen into tons of ice.

I entered up and packed away negatives. The others amused themselves as they pleased.

September 8th, Tuesday.—We set to work after breakfast to fit up a dredge and tow-net, and fix lines to them to do some dredging, as the weather to-day allows of it. This took us all the morning. After many delays we set out in the *Mary Harmsworth*, going west along the land. We found the bottom very rocky and unsuitable for dredging, the spring tide (against us) carrying ice with it, bothered us a good deal, and finally blocked us in altogether off the west point. As it was then getting late in the evening and darkness was coming on we hauled the boat

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up on the shore, and I intend, if the weather allows, to try again to-morrow. She is a fearful weight to handle.

I reluctantly directed the doctor to kill and cut up two out of the three of our remaining sheep, which were brought from Vardo, as we require the hay they are eating for the pony. Being rather dainty feeders, they waste a good deal. The ground is now quite snow-covered and frozen hard, and they cannot find their own food, being less clever in this respect than "Brownie," our pony. They have become pets with all of us, and follow us everywhere, poor animals. I am very sorry to have to kill them. "Nannie," the remaining one (an especial favorite of mine), followed us down to the boat to-day and clambered on to the floeberg when we shoved off, bleating piteously, evidently in great distress at our apparent desertion of her. On our return she met us and followed us into the hut, where she remained all the evening, eating biscuits or anything of the kind we offered to her. Having the sheep here, and seeing them about, quite reminds me of home, and even the delicacy of mutton for dinner, though Norwegian though it be, does not compensate us for the loss of them, and it goes to my heart to kill them. I shall try to keep "Nannie" all winter.

September 9th, Wednesday.—As soon as we had finished our usual morning walk we set out for the spot where we had left the boat yesterday evening. We found, however, that a quantity of ice had since come into the bay and blocked her in. Armitage, in getting into the boat, went over the side, and got a ducking. He is a wonderful hand at taking a bath whenever the smallest possibility of doing so offers itself. I had of course to send him back to the hut to change, and as he is an excellent man, it left us very short-handed. It took us some hours to force our way out of the small bay, and some of the ice-pieces being aground, we had to cut them up, using the ice-anchor as a pick to clear a way. At last, however, we got her free, and pulled towards the northern entrance of Windy Gully. Here a frozen-together pack stopped us and prevented our getting near the shore. We dropped the dredge in fifteen fathoms and put out the net and dragged both for some distance, which was rather hard work, and the boat only forged ahead a few inches at every stroke of the oars. We obtained several molluscs, echinoderms, worms, gastropods, and bivalves. We found there the bottom



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sandy and suitable for dredging, but further round off the glacier-face it is evidently stony, as we only got a laminaria with a sea-cucumber (an echinoderm) attached.

We made a pot of tea on a piece of floating ice in Gunter Sound, and had a little biscuit and fat bacon. We got back to the hut soon after 7 P.M.

September 10th, Thursday.—Directly after breakfast we again started off in the *Mary Harmsworth*, dredging. We went east, under sail, along the edge of the land floe, using the tow-net. We found that even under sail, with a breeze of force 4, we could only move along very slowly, with the dredge out in fifteen fathoms, on a pebbly bottom with shells. We got some crustacea, anylid worms, echinoderms, and protozoa. I shot a ringed seal, which, however, sank before we could get up to it, owing to having the dredge out. Poor "Nannie," in following us, fell into an ice-gorge about six feet deep, out of which she could not scramble. The accident was not discovered until the evening, when she was found to be missing. I discovered her in the chasm, and brought her back on the wheelbarrow, as she has damaged her off hind-leg a little and is lame.

September 12th, Saturday.—After breakfast, the sky being less overcast than usual, I took a number of photographs with the wide angle lens. Armitage tried his hand at dentistry by pulling out a troublesome tooth of the doctor's. The doctor is satisfied with the way in which the operation was performed, so he must have acquitted himself exceedingly well.

We then started off in the whale-boat dredging, and I took a number of soundings in the bay. We found patches of sand distributed among large stones, and succeeded in obtaining large hauls from the dredge, including new species of anylids, crustacea and molluscs. Bay ice is now quickly forming on the sea. Apparently all the birds but one or two kittiwakes, a burgie or two, and a stray mollymoke are gone, and the rocks are silent and deserted where recently there was so much life and bird-music. We shall soon be left alone in our winter solitude.

Winds N.N.W. and N.W., 1 to 3. Sky clouded $\frac{1}{4}$ ths. Rain band o.o.

September 13th, Sunday.—We amused ourselves skating on the pond to-day. Towards evening I came in and developed negatives.

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September 14th, Monday.—After breakfast we all went down and hauled up the *Mary Harmsworth*, and put her to bed for the winter.

The sea is now covered with bay ice, and further dredging is out of the question in her.

September 17th, Thursday.—After breakfast, having finished our regular morning work, Armitage, Wilton, Heyward, and I went on hauling reindeer moss up the slope. The doctor removed the blubber from the seal's skin. We are keeping it to cook with bear-meat. I induced one or two of the others to try some raw seal-blubber. It is very good, and tastes somewhat like butter.

The reindeer still looks very thin, and does not improve in condition, although it has as much lichen as it will eat. It is very wasteful and dainty, and tramples underfoot and refuses to eat as much as it consumes. One hardy "eat-all" pony or horse is better than fifty reindeer away from their natural conditions of life.

September 18th, Friday.—As to-day is very suitable for magnetic observations, I directed Armitage to go on with them. The doctor worked at the bear-skins in No. 2 hut. I made a number of prints from negatives, and printed and developed some "platino-bromide" prints, and made a number of solutions for toning, fixing, etc. Photography is carried on under difficult conditions here, and even after a negative has been successfully obtained, every drop of water used in developing and washing has to be obtained from melted snow.

September 24th, Thursday.—In the evening Wilton and I made a broad snow-shovel for five people, to clear the snow off our skating-pond, as there has been no wind lately to do this for us. Armitage wrote up the meteorological observations. Wilton and Heyward stowed away goods in the stable store. The doctor went on with the bear-skins.

September 27th, Sunday.—We took the tow-net to the floe edge, and obtained a new shrimp, a number of starfish, and a few small jelly-fish.

The doctor is making a sketch-map of Cape Flora, and he went out with Armitage, who took a few bearings for him.

October 2d, Friday.—After breakfast I put out my photographic printing-frames, but the frozen mist renders printing a



KITTIWAKES NESTING ON THE ROCKS OF CAPE FLORA

THE
FEDERAL BUREAU OF
INVESTIGATION
A TOLSON, LENOX AND
TITUS INVESTIGATIONS

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very difficult matter. It takes two and, sometimes, three days now to finish a print.

I set to work to try and repair the musical-box which "our mechanical genius" had so damaged in putting in a set of new notes that the only sounds that can be got out of it are positively unearthly, and half the notes won't strike at all. The "music" resulting is most weird.

Armitage is making a collar for the pony harness. He is utilizing the canvas saddle we made last autumn for material to cover it, and is using two of the union-jack cushions to stuff it with.

We set a line between the shore and a piece of grounded ice for fish, and put out a swab to take smaller life. The doctor worked at the bear-skins.

I saw two ivory-gulls and three buntings to-day.

October 9th, Friday.—As I wish to try the reindeer for sledging the coal up to the hut, after breakfast I made a hide halter, and Wilton and I put it in a sledge. I find it has evidently never been harnessed to anything before—has no notion of dragging—and is, moreover, very vicious, and strikes and kicks at every one and everything that comes within reach of him. A charming animal! It made a desperate charge at Wilton, who was seated on the sledge and was rolled over in a mixed up condition into the snow, where the fiendish deer seemed to lose him; it then dashed off wildly in an opposite direction, dragging the sledge upside-down with it until I succeeded in stopping it. Wilton has reluctantly come to the conclusion that it is not at all a nice animal. I certainly cannot warrant it "quiet to ride and drive." It is a thousand pities that any reindeer were sent, as they would be of very little service here even if well-trained and broken; but young, quite unbroken animals are worse than useless. It kicked, struck, danced about, and flung itself down when asked to draw a weight of 160 lbs. on a light Norwegian sledge!

October 10th, Saturday.—Armitage spent the day in the observatory at the magnetic observations. Wilton continued clearing the dog-house of ice, with Heyward helping for a time.

Winds N.E. 4, E. 2 to 3, S.E. 1, N.E. 2, with gusts up to force 5.

"Gladys" gave birth to five pups.

October 13th, Tuesday.—As "Nannie," our sheep, wastes so

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much hay, which, excepting biscuit, is the only thing she will eat, and as I want every scrap of the former for "Brownie," the pony, I very reluctantly told the doctor to convert her into mutton, for there is no help for it. Poor animal! She had become a great pet with us. I feel very sorry to be obliged to kill her, and it is like losing a friend. I sledged a number of stores up, and placed them in the stable store. After tea the doctor and I sledged away the ice Wilton and Heyward had cleared out of the dog-house.

October 17th, Saturday.—The Arctic night began to-day, and we saw the last of the sun yesterday until February 23d. Again another winter is upon us—now the third here, and the fourth I have spent in succession inside the polar circle. No one properly appreciates light until they have spent a winter or two on the 80th degree, and know what it is to be in perpetual darkness for four months at a stretch.

I calked the crevices in the walls of the stable store, to prevent snow from driving in, and swept it out. Armitage took the usual weekly magnetic observations. Wilton went on with the dog-house. The doctor worked at the geological specimens.

October 18th, Sunday.—After breakfast we all went east on our ski. Wilton and I again went to the top of the glacier by the Windy Gully Rocks and ran down it three or four times. The others did not care about taking it on, but remained near Sharpe's Rock, where the incline is less, and a slower speed can be maintained. Wilton goes very well upon the ski, having used them at Archangel.

October 20th, Tuesday.—A flock of birds were seen in the sea off the flag-staff. Thinking that probably they would be in their winter dress, the distance being too far to make them out, and the light too dim, I called Wilton and we carried the twelve-foot Norwegian boat down, and, taking my gun, we managed to force it through the bay ice into shooting distance. We found they were dovekies, eleven in number, in their winter plumage. I succeeded in bagging two—one adult in winter dress, and a young one in winter dress also, with the legs nearly as red as in the adult, but with a tinge of brown in them still. The young bird I killed in August, 1895, had quite brown legs.

We all then went for a ski-run to the eastward, and Wilton and I ran the glacier two or three times. There is distinct evidence

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of this glacier having receded considerably. To the northward, partly extending across Windy Gully, is a high, large mound of earth and stones, evidently an old lateral moraine, and at the foot of the gully leading up towards Windy Gully Rocks are large boulders of basalt worn quite flat and scratched evidently by ice, over which the glacier then passed. Evidence of the recession of glaciers is noticeable on Capes Grant and Neale, where old moraines are visible.

October 21st, Wednesday.—The doctor and I sledged coal up with the pony from the top of the plateau up which we had hauled it, and after tea he, Wilton, and I went for a ski-run east. The others had gone earlier in the afternoon. It had snowed all night and the greater part of the day without wind, and there is now a good covering of snow over the land. "Brownie" is still getting the greater part of her food herself. She scrapes away the snow with her fore-feet to reach the sparse grass, and is as good as a reindeer at it. She has only two or three Spratt's cod-liver oil dog-biscuits given to her daily, which she occasionally supplements by stealing more from the dogs tied up round the boulders near the house, much to their indignation and her amusement. She is thoroughly adapted for the Arctic. She eats bear-meat but draws the line at walrus, with which taste I sympathize, for I do so also if I can get any other fresh meat. None of us care for walrus.

October 22d, Thursday.—To give my chaps a little amusement, I arranged that a match between Wilton on foot and the doctor on ski should be run to-day down the glacier-slope from the Windy Gully Rocks, and I put up a tin of tobacco as a prize for the winner. While waiting for one or two members of the party, Wilton and I put the twelve-foot Norwegian boat into the sea for me to try and shoot some seals I had seen in the water. Soon afterwards I saw some dovebies in their winter plumage, and we pulled back for me to land and fetch a shot-gun to kill them for specimens. In stepping out on to the ice-foot it broke away with me, and the small boat at the same time dipping bows under and upsetting, threw me into the water. I got hold of the ice-foot and tried to pull myself up, but was quite unable to do so owing to its perpendicular height above me—about four feet—and its slippery surface sloping downward gave me no hand-hold; my clothes had also become exceedingly heavy. Wilton in the mean-

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time had very promptly thrown my .303 rifle on to the ice-foot out of the water-logged boat, which had partly righted itself on being relieved of my weight, but was sinking, and after several minutes he succeeded in getting ashore off the keel of the overturned boat. I had made up my mind to swim back to it, as I found it quite impossible to get up the ice-face, and my strength was going. He then ran round to where I was, and after several attempts and much hauling and struggling, managed to give me a hand out. I had been in the water about five minutes. The cold did not bother me much, but the weight of my heavy clothing drenched with water did, and the tide was running fast under the ice. It would have been an easy matter for both of us to have been drowned, and no one would have known what had happened to us. Fortunately, Wilton had the boat to help him out, otherwise we should have had to swim back to it, and have tried to push her to some low bay ice, and to clamber out upon it if our strength had held out, but it would not have been altogether a joke. We had a good laugh over it when we got out, but it was near not being a laughing matter. We went up and changed, and I sent Armitage and the others down to put the small *Eira* boat into the sea to recover our cranky Norwegian one, and to shoot the dovekies. We then went off to the Windy Gully Rocks where the race came off, and Wilton won easily. The snow was deep and "sandy," making it very bad for ski-ing, otherwise the result should have been reversed.

October 27th, Tuesday.—After breakfast Wilton reported to me that the reindeer seems very weak and can hardly stand. I went and saw it, and found it again lying down. I had intended to put a log on it and turn it out on the cape, hoping that the comparative freedom might enable it to put a little flesh upon its body, but it would have to take its chance of being killed by a bear, which would in all probability happen. I, however, decided to shoot it "to save its life," and add what little meat there is on it to our larder, as I could see it would die within a short time. I would never have attempted the experiment with any deer that had not been brought up from fawns upon artificial food, which can be carried sledging, and had been thoroughly broken to sledge work and used to confinement. But even then I doubt very much if they would be the best form of draught animals out of their own kind of country, where their natural lichen grows every-

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where. For coast sledging here horses are far and away the best. I had much experience with reindeer when sledging with the Samoyads and Lapps in the winter of 1893-94.

I put three thermometers in pickle-bottles, and placed them in the screen to compare with the others. I am anxious to take temperatures upon the summit of Cape Flora through the winter, but I find it very difficult to hit upon a plan for exposing them in a satisfactory manner to give accurate readings. I think placing them in pickle-bottles lashed to an upright may do it. Tins, screens, or boxes of any kind all have fatal objections. The frost-rime at that altitude is exceedingly troublesome.

October 28th, Wednesday.—The doctor and I dug out of the drift and sledged up to the stable the whole of the hay sent for the sheep. After tea he, Wilton, and I hoisted it on to the roof of the stable (there are, in all, seven and a half trusses). It is, however, like the reindeer moss, drenched with water, and consequently exceedingly heavy, and until dried, which it is difficult to do here, quite useless for sledging on account of its weight. I shall never take hay for that purpose again unless absolutely obliged; it is too wasteful and bulky, and readily becomes driven full of snow on the sledge, which adds very greatly to the weight. Oats and dried vegetables in proper proportions make splendid food, and are very convenient to carry and use. We are, unfortunately, out of both, with the exception of a little I am keeping for sledging next spring, and I am feeding the pony on hay and Spratt's biscuit.

Wilton and Heyward worked at the dog-house.

Winds E.N.E. 4, N.E. 3 to 4, E. 1 to 2, E. 2 to 3. Sky clouded from $\frac{1}{10}$ ths to $\frac{1}{8}$ ths until 8 P.M., when it cleared to $\frac{1}{10}$ ths. Misty at 4 P.M.

I find the minimum thermometer placed in the pickle-bottle registered the same as our standard minimum for the last twenty-four hours.

"Brownie" frequently steals bear-meat from the dogs, and daily eats about two pounds of it. She is a wonderful feeder, and just the "gee" for the Arctic. Thank goodness, she is not particular. She has become a great favorite, and follows us about like a dog. I've a real affection for the good little beast, and look forward to giving her a good time for the rest of her

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life after we have finished our work here, if I can only keep her alive to return home.

October 29th, Thursday.—We dug out and brought up the bear-meat from near Sharpe's Rock which had been stowed there some weeks ago. Wilton and Heyward finished stocking the ice out of the dog-house.

Wind E. by N. 1, N. E. by N. 3, N. E. 1 to 2, N. by E. 2. Sky clouded all day from $\frac{1}{10}$ ths to $\frac{1}{10}$ ths, except at 4 P.M. when it cleared to $\frac{1}{10}$ ths.

To-day I find that the thermometers enclosed in bottles show uneven readings when compared with the standard thermometers in the screen. I think that to carry on synchronous observations at the hut and on the summit of Cape Flora would have little value under the circumstances. I shall, however, place a maximum and minimum in bottles on the top and read them when convenient. It will give us a good idea of the highest and lowest temperatures up there.

October 30th, Friday.—The doctor and I ascended Cape Flora by the glacier, and placed a maximum and minimum thermometer in a bottle on the top of the cairn on the edge of the cliffs behind the hut. (Temperature on summit -6° and -2.5° at the hut.) The cairn (the flag-staff had been blown away) and everything on the top was covered many inches deep with frost-rime. The edge of the summit is very precipitous, and being ice-clad is rather dangerous in the dim light, and one has to feel one's way along with caution: a false step might send one crashing down the front of the cape a thousand feet below. I set Armitage to work to begin to make a canoe to carry sledging next spring, and he commenced the framework, using the bamboo boat masts and booms for the purpose.

The twilight at noon is getting very dim, and winter is rapidly drawing its dark, gloomy mantle around us. The birds have all flown to the south, and death-like stillness now reigns on the rocks where their cheering notes have been as music to our ears through the short-lived and comparatively winterly summer of this land of the north, where the ghostly Frost-King allows Old Sol to dispute his sovereignty for a short time only. Perpetual darkness will be ours for four months to come, and for that time we shall not know the cheering light of day. It is with a feeling

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of sadness that we see his rays grow daily weaker and weaker, like a dying friend, and at last he sinks to appear no more. Each of us wonders if we all shall stand near the flag-staff to welcome his return, or will some of us, during that long darkness, have gone forth into the gloom, and have found our rest upon these icy shores.

November 3d, Tuesday.—The doctor and I finished sledging up and stacking the coal, and also brought the ten bags of salt up.



OUR COAL-SACKS

By moonlight

ter tea I worked at the frame work for the new canoe, and the doctor cleaned a bear's head, to be stowed away with the skins. Mitage helped me with the canoe and then went out on his ski the eastward for the usual exercise. Wilton and Heyward ran to roof in the dog-house. "Bardock" died during the night from no apparent cause. He was all right yesterday. He was little use for sledging, however.

November 4th, Wednesday.—As I think it is possible to get es by means of a spring-gun, and every other means has failed, I set to work to convert a shot-gun into one, lashing a trivance of wooden levers to it for the purpose.

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About 3 P.M. Wilton and I went east for a run on ski, returning over the floe. The doctor finished a bear's head. Armitage worked at the framework of the canoe. Wilton and Heyward went on roofing in the dog-house. All hands go for a run on ski or for a walk every day. This has been the rule ever since we landed here.

November 10th, Tuesday.—The doctor and I went on ski to the Gully Rocks to look at my spring-gun which I set there, but found everything untouched. It is now practically dark all day, and we are beginning to speak with longing for the return of the sun. Still, the dim twilight we get now for an hour or two is infinitely better than the greater darkness which we shall soon have when, practically, noon and midnight are alike. People who have wintered only on the 70° N. or 75° N. are possibly unable to appreciate the greater darkness on the 80° of latitude, or understand what a difference five or ten degrees make. Life is the acme of monotony during the winter here. It is bad enough during the light; it becomes worse as time goes on. A more trying life than that of prolonged residence in the Arctic is difficult to imagine. It is wearisome in the extreme. People generally have an idea that it is the cold and badness of the climate that are the most unpleasant features about it. Not a bit of it. To me it is the deadly monotony of our daily life, the long period of comparative inaction that is unavoidable, and the deadly sameness which one is unable to get away from for an instant, being boxed up with the same companions day after day, month after month. It is a life, however, to imbue patience and forbearance in all, and should do one good in that respect.

Wilton went on with the dog-house, Armitage worked at the canoe, the doctor packed up and labelled geological specimens; and each and all are cheerful and jolly, in spite of the monotony of our existence, and of depression there is no sign. I have thorough good fellows with me, and of this I am proud.

November 12th, Thursday.—This morning Wilton and I went for a walk east upon ski. It was dark and very misty, so much so that we got upon the top of a sloping berg, with the one edge towards us level with the floe, and the other ending in a drop of from six to nine feet, over which Wilton fell without seeing it, but without hurting himself, fortunately. When near Sharpe's Rock "Misere" spotted a bear (the first seen for a long time)

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about fifty yards off, which had apparently been stalking us. We left him to take care of "Mr. Bear," and returned to the hut for rifles. Unfortunately he left him, and on our return with "Nimrod," they were unable to get on his track, owing to the mist and darkness. "Nimrod" is now our only bear-dog; the rest are not worth much for hunting. The pups, when older, no doubt, will take to it, as they even now exhibit very distinctly sporting instincts.

November 14th, Saturday.—The doctor, Wilton, and I went for a run on ski on the floe west at mid-day as far as the glacier. Armitage has been engaged at the weekly series of magnetic observations all day; the others at their regular work.

Winds N.E. 6, N.E. 3 to 4, E.N.E. 1 to 2, N.E. 1. Sky clouded $\frac{3}{10}$ ths to $\frac{1}{10}$ ths.

The doctor had quite a field-day to-day. As I got him to snip off "Joey's" dew-claws, as breaking through the surface of the snow makes him go lame. This should have been done when he was a puppy. He is a little under-sized Lapp dog which arrived by the *Windward*, in addition to the reindeer, for draught purposes.

November 16th, Monday.—I see in a June number of a newspaper of 1895 an announcement and description of the discovery of photography in colors, which appears to be entirely successful and very simple. I wish a few ruled glass-screens had been sent to me this summer. Photographs in color would add immensely to the value of the expedition in so many ways, and the colorings on the rocks here of bright reds, greens, and dark browns are very beautiful, as also are the brilliant purples, greens, and golds of the mosses upon the plateau. I hope some one may think of it next year.

I tried to photograph the aurora this evening, but after waiting outside with the camera for two hours I had to give up the attempt for the night, as it proved too transient for there to be a chance of success. I feel sure a very long exposure is necessary.

"Brownie" appears to be doing very well on her miscellaneous diet. In addition to her regular feed of Spratt's dog-biscuit, ship-biscuit, and hay, she shares the scraps left from our meals with the dogs, and very frequently helps herself to their

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bear-meat, and shows a fondness for picking loom-skins lying around the hut. She is a wonderful animal! I let her run around the hut when the weather is good, and she often trots off east and finds a meal for herself on grass from which she scrapes the snow with her feet. I try, however, to prevent her going far away now that it is dark all day, as I am afraid of a bear sneaking up to her and killing her.

We are again beginning to be bothered with sleeplessness, as in previous winters. The doctor can offer no explanation as to the exact condition of body or mind that the darkness produces and which causes it.

November 17th, Tuesday.—By dint of constant supervision, on the part of the doctor and myself, we are able to turn out decent bread: until recently it has been horrible stuff. To make the yeast, we find the following recipe answer well:

Take two handfuls of hops, to which add a quart of water and boil for half an hour. Pour off the liquor, to which add a table-spoonful of flour and a dessert-spoonful of sugar. Place it in an uncorked bottle and hang it up in a warm temperature for twenty-four hours, shaking it occasionally. Take five ounces for ten pounds of bread. On taking away the five ounces of fermented liquor, replace them with five ounces of warm water and a dessert-spoonful of flour: some add a further dessert-spoonful of sugar also, but it appears to be hardly necessary.

Well knead the dough, then allow it to stand in a warm place for twenty-four hours; then well knead again, pressing in as much flour as the dough will take, allow it to stand for an hour or so until it has risen again, and then bake it in a covered tin. A fresh lot of yeast should be made once a month, as it is liable to become sour.

About 6. P.M. I took the cameras on to the floe to get moon-light photos of the "big berg," and fetched them in at midnight.

Winds N. 4, S.W. 2, S.W. 1. Sky clouded $\frac{2}{10}$ ths to $\frac{4}{10}$ ths.

November 19th, Thursday.—The moon being bright, sky clear, and very little wind, I took out the half-plate and hand cameras to the floe, and set them for time exposures on the berg and for a panoramic picture of the coast-lines here. I went backward and forward from them to the hut at intervals of a little over an hour until after midnight, and I reckon that I have walked over nine miles to-day in doing this. Wilton and I measured the

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berg with a tape-measure, finding the height to be sixty-one feet, and at the base measured 456 feet round. This is nearly as high as any berg I have seen in Franz-Josef Land.

November 23d, Monday.—The doctor and I noticed to-day, when out east, that the tide has forced its way through some cracks at the head of the bay, and on stirring up the mixture of snow and salt-water with my ski-stick, we noticed bright phosphorescent bodies in it shining like glowworms. We collected a number of these, and found them to be crustacea (not before obtained here) about the size of a grain of rice.

As "Misere" is showing indications of a desire to eat "Mr. Råwing, Jr.," I constructed a muzzle for him to-day, which he now wears. He doesn't like it a bit, and looks very absurd, but his murderous propensities must be checked.

November 25th, Wednesday.—I again tried to photograph the room, using the rapid rectilinear lens F. 8, landscape films, and one hour's exposure. These came out much better. I think, perhaps, my previous failures may be owing to the developer I have used. To-day I changed it for amidol. I then went for a little exercise on my ski on the floe, but it was blowing so hard, with such dense driving snow and thick mist, that it was impossible to find a way at all or to keep the land in view, and I had to return to the plateau by the hut. Armitage and I worked at the canoe after tea. The doctor packed up geological specimens.

November 26th, Thursday.—To-day I tried the wide-angle lens on our general room, giving two hours' exposure with a landscape film. The doctor and I then went for a walk on the floe, I using my ski. It was, however, very dark and misty, making it difficult to find one's way.

Open water runs for some distance up Gunter Sound. After tea I developed the negative of the room, which is more successful.

December 1st, Tuesday.—As the aurora was bright and the weather calm and clear, I made five photographic exposures with rapid plates, using the rectilinear lens and a stop F. 8. On one plate only did I get a faint impression, and that was of a single streamer, which remained fixed for a considerable period, and then appeared and reappeared in the same spot several times.*

* This was the only impression of the aurora I ever obtained, although I tried on a great many occasions.

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I believe the aurora has never been photographed. I then made a few bromide prints from the negatives I have recently taken.

Armitage took an observation for time. The doctor worked at the geological specimens.

Winds calm, N.W. 0 to 1, N. 1. Sky clouded $\frac{1}{10}$ th to $\frac{4}{10}$ ths.

December 4th, Friday.—I took out the camera and set it for two hours for the aurora. Although I got a slight impression of part of the rocks of Cape Gertrude and Cape Flora, no trace of the aurora could be found on the negative. Its rays evidently have small photographic value. There was no moon, but only starlight.

I have been doing my utmost to increase the number and quality of our dogs by breeding, as they have decreased in number to an alarming extent, and our team will soon be reduced to puppies born here, of which my two little Samoyad bitches, "Sally" and "Jinnie," were the mothers or grandmothers.

December 5th, Saturday.—Set the camera to take the southeast side of the living-room, giving four and a quarter hours' exposure. The doctor and I went for a ski-run to the top of the east glacier. All the tinned vegetables have been used. Two hundred pounds of tinned vegetables came by the *Windward*. Two pounds (one tin) make a small allowance for six people per day. We have some dried potatoes, some haricot beans, and about half a peck of dried peas. The dried vegetables, which I have been keeping for "Brownie" for spring sledging, I shall not have touched, but shall reserve them for that purpose.

Armitage took the usual weekly set of magnetic observations. The doctor finished labelling and packing the geological specimens. I developed negatives and made transparencies.

Calm all day. Sky clouded $\frac{1}{10}$ ths to $\frac{1}{10}$ ths. Misty at 8 P.M.

December 10th, Thursday.—As the new moon was just appearing above the southern horizon, I took the camera out beyond the hut and exposed a negative upon it for a second, and then closed the dark slide until after the moon had set, as the movement of it across the negative would have produced only a streak if exposed longer. I then opened the dark slide to get the landscape, giving five and three-quarter hours' exposure with F. & S. and a rapid plate. I thus got a natural moon in my photograph.

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Winds N.E. 3, N.E. 4. Calm. Sky cloudless all day. A good deal of aurora.

December 14th, Monday.—I am making a tent of my own design, using some old light canvas sledge-covers I had on my Waigatz Expedition. The doctor has made a good suggestion for an entrance, and I think it will be a model tent for the Arctic. It will be very light—not exceeding, I think, twenty pounds in weight—and can be expeditiously put up. Armitage went on with the canoe. The doctor began to make a photographic album for me to put my prints in from some seal-skin I have. He is very clever and neat with his fingers, and everything he does he does well.

Things have been going very smoothly and pleasantly; there has not been a sign of quarrelling or unkind speaking, and every one is happy and well. Heyward has shown marked signs of improvement in his cooking and in every way. I praise his endeavors and encourage him to persevere.

December 15th, Tuesday.—I went on sewing the tent, Armitage worked at the canoe, the doctor made progress with my photographic album.

I let "Brownie" run about outside the stable most of the day now. She takes a short stroll down east to try and dig out the grass, but there is now too much hard snow for her to find it. We have fourteen pups in the stable (four of "Gladys's," four of "Daisy's," and six of "Madame Kara's").

Winds N.N.W. 2, N. by W. 2, N.W. by W. 1 to 2. Sky clouded $\frac{1}{8}$ ths to $\frac{1}{2}$ ths. Nine hours snow. Foggy all day.

December 16th, Wednesday.—Armitage worked out the observation for latitudes taken on the 11th from two stars, making the latitude from both $79^{\circ} 56' 6''$ N., both agreeing within a decimal or two, but this puts the latitude of the hut a trifle farther south of previous observations.

December 17th, Thursday.—As the morning was fine and clear, with the moon three-quarters full, I arranged a ski-run. Wilton and I went east, and I examined the spring-gun, as the moonlight is now light enough to find it without the risk of getting foul of the lines by accident and so shooting one's self. I found both barrels discharged and the two baits taken. There was so

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much snow covering the ice that I could not be sure if any dead foxes are lying near, but I have a shrewd suspicion that they have contrived to fire the gun and take the baits without harm to themselves. Wilton and I then went up Windy Gully, running the glacier several times, and met the others on the floor in Gunter Sound. It is remarkable how a fine pleasant day (although it is night) makes every one so especially cheerful and happy. Light has a wonderful effect upon human beings.

I did some photography on getting back to the hut, but the sky soon misted over and stopped me.

Winds W. 4, N.W. 4, N.W. 3 to 4, W. 4. Sky clouded $\frac{1}{8}$ th to $\frac{1}{10}$ ths. Snowing and misty at 8 A.M. Lunar halo at 8 P.M. and sky clouded, moving rapidly from the north.

December 19th, Saturday.—I am having loom-meat fried every day for us to take sledging. It will save fuel, time, and weight when on the journey. I find by weighing it that a pound and three-quarters before being cooked loses half a pound in frying, weighing a pound and a quarter after, even with the addition of fat. It is a great economy thus to get rid of water and save weight.

"Jack," "Sally's" son, died yesterday morning without an apparent cause. I wish I had some bear-meat to give to the dogs, for a little change of food is useful. The dog-biscuit is excellent, and they have been living upon it for many weeks. Bears have been very scarce for a long time.

December 20th, Sunday.—The day being clear and moonlight but with a good deal of wind, I went east with young Heyward and we got a fine ski-run from the top of the glacier behind Cape Flora into Windy Gully. He is a plucky fellow, and goes well on ski. I noticed the tracks of a bear following for a long way down some of my old ski marks beyond the Castle Rock, evidently during the recent very dark, misty weather. The others all went for a ski-run towards Cape Gertrude.

Soon after my return I found to my surprise that the ice to the southwest was breaking up, probably caused by the spring tides, a swell from the southwest, and the high wind, and that there was open water running from "Bear Berg" to the large berg which I had used for my photography, and away towards Miers Channel, leaving only a tongue of ice connecting the large

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berg, a mile off the land, with the land floe. I had left the stand of my camera upon the berg on Friday, when doing my photographing there, and was stopped by the weather from finishing, in order to have it in exactly the same position when I may be able to resume my panoramic view. As I expected this tongue of ice to break up, I started off to the berg to rescue the stand, leaving Armitage on the lookout on shore to launch the twelve-foot Norwegian boat in case I got adrift upon the ice, although I think there would be little chance of his being able to give me any help if this happened. As I approached the berg another large piece of the floe broke off, and was rapidly driven away before the wind and tide into the darkness. After a rapid run on my ski I secured it, and was very glad to find myself with the camera-stand safe on Cape Flora again, for I anything but relished my trip to the berg, but I had no desire to lose my stand. The bitterly cold gale was still blowing fiercely, driving fine shotty snow before it, which cut one's face like hail, and the low temperature was very productive of frost-bites and general discomfort.

December 21st, Monday.—The shortest day, thank goodness! I am a devout sun-worshipper. Now the light will be returning to us, the gloom of night in a few weeks will lessen, and we can take our daily walks without stumbling over obstacles at every step. Our explorations can be resumed, and the long nine months of comparative inaction, so hard to endure, will be brought to an end.

When I went out of the hut after breakfast I found to my consternation that the reindeer-house had been carried away by the gale, and all the sledges and most of the sledging-gear had disappeared. I called out all the party to try and recover them, and after searching on the floe for some hours, we managed to find all the sledges, and, much to my surprise, so far as I can see in the dark, they are uninjured. The reindeer-house is reduced to match-wood, and only very small portions of it can be found scattered over the ice. We placed the sledges in a sheltered spot at the edge of the floe until the wind abates, as it was then blowing a fresh gale with fierce gusts of force 10 every moment, driving fiercely before it hard, shotty snow, which cut our faces like a whip, so carrying them up the steep slope in the teeth of it was out of the question. We found it difficult to stand upright against

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the wind, which, with a temperature of 16° below zero, was a little cool.

This sort of weather continued until evening, when the storm suddenly ceased, the wind fell to a light breeze, and bright moonlight shone out. I seized this opportunity to complete my panoramic views, and taking the camera out to the berg, I set it up again and took three negatives, which now completes the series. The ice has still further broken up near the berg, and I felt a little uncomfortable while I was out there lest it should continue this process of disruption while I was on it, owing to the fast running spring tides and the swell the wind has set up.

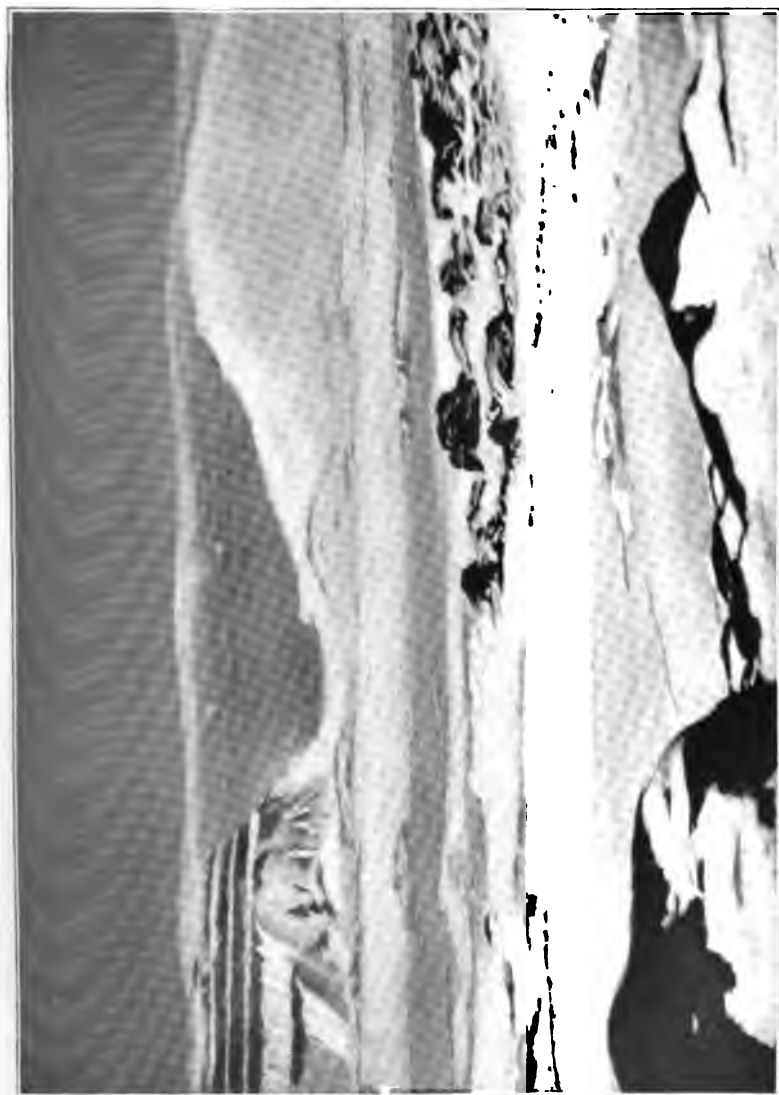
I skied six miles backward and forward to change the dark slides at the end of each hour, and did not finish until after 2 A.M. After all my pains and some risks run, I hope I shall get satisfactory results.

This afternoon Wilton and I went on with the tent; Armitage worked at the canoe, the doctor at my photographic book. I have asked Bruce to get a drag-net ready for to-morrow, as I think, unless the bay ice forms too rapidly, we can use it now along the newly broken floe edge, which is firm right up to the water. I am anxious to obtain marine life through the winter. He is making a new net to-night.

Winds N. 8 (and gusts of force 10 every moment; the aneroids were pumping $\frac{1}{10}$ ths in the gusts), N. 7 (gusts of force 9), N.W. 2 to 3. Sky clouded $\frac{1}{10}$ ths to $\frac{1}{10}$ ths.

I will here endeavor to describe an ordinary winter day's work though—paradoxical but true—a great number of days in the Arctic are nights. About 8 A.M. we turn out of our blankets and all have a good wash, and the man whose turn it is has a bath (one man has a bath each morning; the scarcity of water will not admit of more than this). Breakfast then follows, consisting of porridge, tinned fish, fried bear-meat, and tea or coffee. The work of the day then begins. The house is swept out (a duty usually performed by myself during the last twelve months), the breakfast things washed up, and other domestic duties performed. The dogs and pony too have to be fed, the stable and dog-house cleaned out, and the animals exercised.

All then go the regular daily walk. This, unless there is a moon, is taken round and round a circle on the floe marked with



"THE SCENE OUTSIDE THE HUT IS DESOLATE AND DREARY IN THE EXTREME"



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small flags, where we stumble over the rough, hummocky ice through the mist and driving snow two or three hours each day.

This rather treadmill-like exercise being completed, we all return to the hut, where we set to work upon the duties in hand—making tents, dog-harness, pony's snow-boots, weighing out provisions for sledging, and making ration-bags, etc.

In addition, our scientific observations are taken regularly. Throughout the first two winters meteorological observations were carried on two-hourly throughout the night and day, the party being divided into watches for the purpose.

The scene outside the hut is desolate and dreary in the extreme. To the north, behind it, the high basaltic cliffs with the steep talus running down are dimly discernible through the dense mist and falling snow. An occasional gust of wind still comes rushing along at irregular intervals—the expiring remains of a recent gale—and carrying a whirl of icy particles with it. All around elsewhere is an indefinite white expanse, from which here and there project ice-covered boulders. The wind still moans in the cliffs above us. A short distance off the land the roars of ice-pressure proclaim the commotion there existing, now rumbling like distant thunder, now breaking forth into screams and howls suggesting a thousand devils in torture, and then dying out in a shrill whistle like a railway train rushing into a station. For a few moments all is still, and then those weird sounds continue. With loud booms as of distant heavy guns and a medley of yells and shrieks, ice-blocks can be seen piling themselves up in long lines as far as the eye can reach in the gloom of night.

Once a month we get the eagerly looked-for moon, which, if the sky is clear and the weather is calm, entirely alters the aspect of the landscape. Then the fantastically irregular surface of the great ice-floes, the frost-covered cliffs, and the slopes of the eternal glaciers silently and slowly flowing to the sea, are lighted up with a silvery brightness, and all is still and peaceful. Everything in life appears more cheery. Long runs on ski are taken, and should a bear make his appearance and a chase ensue, the day is a red-letter one indeed. Unfortunately such days in Franz-Josef Land are of rare occurrence, and the more dreary weather which I have tried to describe is characteristic of the winter in this country.

At about 3 P.M. we knock off work for a few minutes, and

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have a little tea, bread or ship-biscuit and butter, and then resume our work until 7.30 P.M., when it ceases for the day and we have dinner, consisting of dried soups, bear-meat, and pudding; after which every one follows his own devices—plays cards, smokes, or reads until 11 P.M., when we turn in for the night. Liquor we never touch during the day or when hard work is to be performed. Liquor is worse than useless when physical endurance is required; tea is infinitely better, and is a satisfactory stimulant. During the first two years we had a nip each of port or whiskey on Saturday and Sunday nights, and during the third year of our stay, when we were better supplied, on most evenings. Liquor is of no physical service, but morally, in the strict moderation in which we used it, its effect is good. It changes what would otherwise be a dull, monotonous evening into a more or less jolly one. Men like a nip to smoke and yarn over. It does good and not harm in this way. I never had the smallest trouble connected with liquor. It always stood on our rough, home-made "sideboard," but no one thought of touching it without an invitation from me, even when it had become customary to have it each evening and occasionally I forgot to offer it—further evidence of what good fellows I had the honor to command. I certainly think our greatest enemies are perpetual darkness and want of companionship. For six men to be boxed up for years in a hut 20 ft. long by 20 ft. wide—the actual living space of which is about half that—never seeing any other being nor hearing a scrap of news, is a trying existence; yet I can unhesitatingly say no jollier or happier little party ever lived in northern latitudes. Four months of solid night every year has, however, a depressing effect, not only on the spirits but on the appetite, and it also destroys sleep. Morning, noon, and night become unrecognizable, merged into one endless gloom, and but for the welcome advent of the moon once a month, when the sky is sufficiently clear for us to enjoy her rays, we live in a blackness the dreariness of which is indescribable.

As the Englishman in distant climes counts the days to the arrival of his home mail, so we count the hours to the return of the sun, and even as the first rays become visible our spirits rise, and existence altogether wears a different complexion. Then exercise becomes enjoyable, instead of that dreary daily trudge



"THE FANTASTICALLY IRREGULAR SURFACE OF THE GREAT ICE FLOES"

Cape Flora from the floes by moonlight

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round a given circle in the dark : with the return of the light we feel new life and energy. And yet the climate of Franz-Josef Land, even in spring, would not suit all tastes, and is anything but springlike in character. Driving snow, wind, and bitter cold are general ; for, be it understood, in all these years the thermometer has never risen higher than eleven degrees above freezing-point, and seventy to eighty degrees below that point is quite common.

They say eels get used to skinning—well, we may have fairly got used to wind, mist, snow, and bitter cold—but we hardly like it!

December 23d, Wednesday.—This morning we discovered that the funnel and cowl to the hut stove had been carried away in the night by the wind, and that the stove would not burn without smoking abominably ; so we had to let it out until Armitage and I had hunted up some old piping and had fixed it up. Wilton and I then searched with lanterns over the floe for articles carried away, and collected portions of the reindeer-house at the foot of the slope. My "soveik" was found on the floe, but the fur breeches had got separated from the bundle in which they were tied, and although he and I looked for hours we could not find them. It has been blowing a moderate wind, ranging N. by W. to S.S.E., with gusts up to force 8 all day.

This evening, it being our doctor's thirty-sixth birthday, we had a little festivity in the way of rum punch and a few of my remaining cigars to celebrate it. I had arranged with Armitage that he and I should sit up to 4 A.M. to take an observation for longitude (absolute) by moon-culminating stars, which came on then, as the weather was clear and the wind gave signs of abating. I also took out my camera to the berg to take another negative for my panoramic view in place of one which is not entirely satisfactory. Armitage went out with me. I had, however, hardly set up my camera when the wind woke up to a gale from north-east, with driving snow, and obliged me to take it down. As the gale was straight in our teeth when returning to the hut, with a temperature of 26° below zero, we got a good deal frost-bitten about our faces. This put an end to the observation for longitude as well as to the photography.

Winds W. by N. 4, E.S.E. 4, S.S.E. 4, N.E. variable, with incessant gusts of force 5 to 8. Sky clouded $\frac{3}{10}$ ths to $\frac{9}{10}$ ths.

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December 24th, Thursday (Christmas Eve).—Bruce and I took down the tow-net to the floe edge. He had unfortunately left it in fifteen fathoms of water for a few minutes while he went back to the hut to make a swab to let down. In the interval the ice came in with the tide and overran the floe for some yards, nearly burying the line to the net. We tried to clear off the ice, but had to leave it until the moon came round in the evening and gave us some light, owing to the unsafeness of the ice around. After dinner we cleared away the ice with a pick and cut a hole through the bay floe, but could only recover the line, owing to a quantity of ice having been squeezed underneath the floe as well as on the top of it. I went on with my work at my new tent. Armitage worked at the canoe. The doctor gave Heyward a hand with the Christmas preparations. A wonderful cake is in progress, I believe, the absence of some of the usual ingredients in which, as the presence of others, is a little startling. However, we are not likely to be very critical; and anything bearing the semblance of a cake will be most acceptably received.

After dinner I took the camera out to the berg to get the negative I require. I am doubtful if it is satisfactory, owing to the moon becoming clouded over soon afterwards.

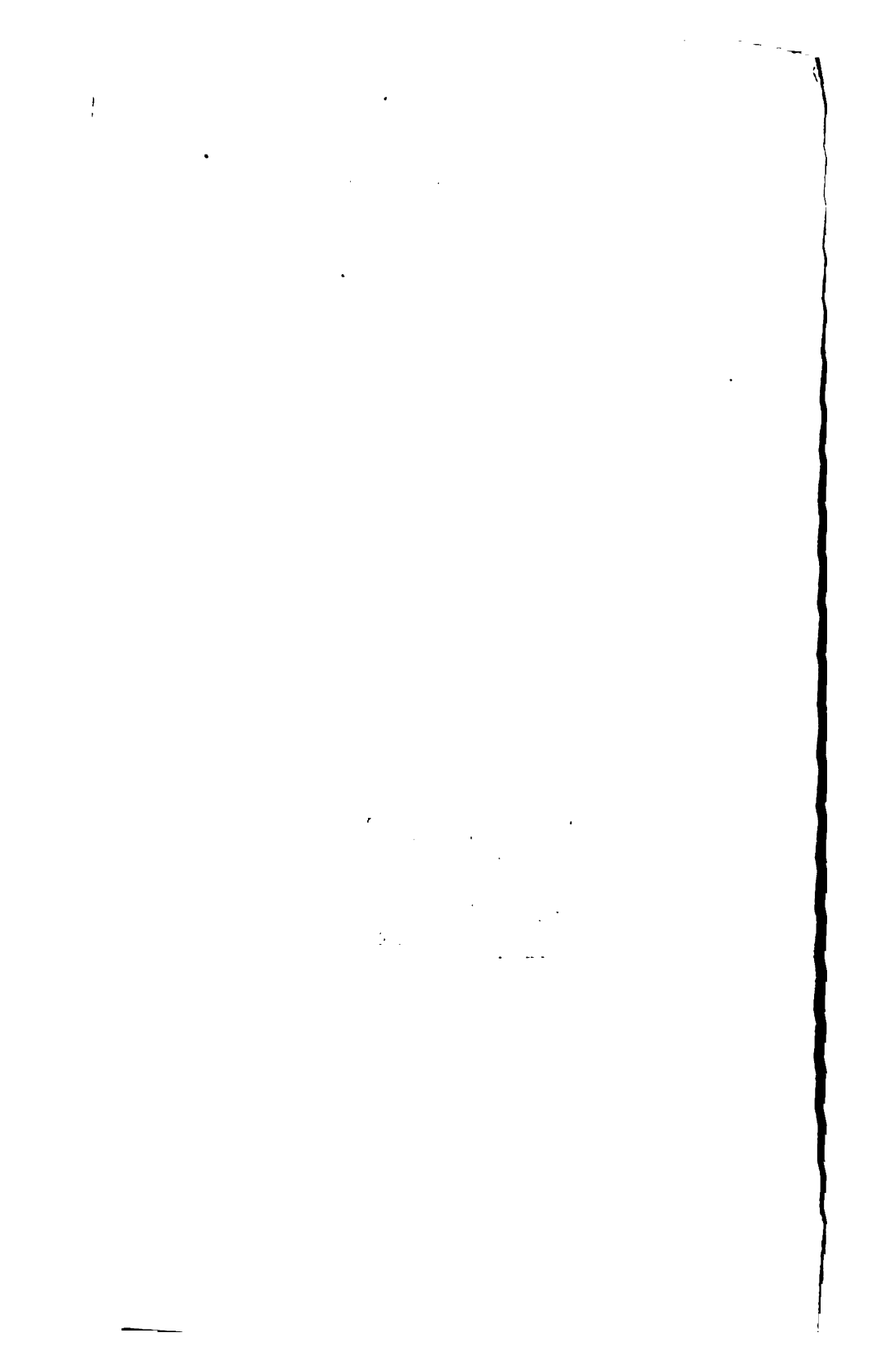
Being Christmas Eve, we indulged in rum punch and a box of cigars and cigarettes which friends had sent out, and which I had reserved for Christmas. We had quite a jollification, and were very festive.

Winds W. by N. 2, E. by S. 2, E by S. 3. Sky clouded $\frac{1}{10}$ ths to 0, but cleared in the evening to $\frac{1}{10}$ ths.

December 25th, Friday (Christmas Day).—Another Christmas! Another year drawing to a close! We have done some geographical work; we have added to our map; we have welcomed unexpected guests, and seen them depart to more hospitable regions. Christmas conjures up memories of friends and home. Remembering former Yuletides, ours is a poor attempt at festivity. We have no presents to give or receive, no holly decoration, no beef nor turkey, and the shouts of children's voices round a Christmas tree are wanting. All the recognized associations of Christmas are absent. As far as the weather is concerned it has been a thoroughly unpleasant day. It has been blowing from an easterly and east-southeasterly direction, from a moderate wind to a fresh



OUR CHRISTMAS DINNER, 1896



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gale, with snow and mist, and a temperature of about 26° below zero.

After taking a little exercise I fitted up a pair of ski with new lashings. The others read and smoked, as we are of course observing to-day as a holiday.

As we sat down to dinner at 8 P.M. I took a photograph of the party at table, using up the remainder of the magnesium ribbon I had.

Heyward cooked us a very good dinner, the chief attractions being a haunch of mutton (kept for the occasion), Mrs. Alec Tweedie's plum-pudding, redolent of Buzzard's, followed by cigars and cigarettes with rum punch afterwards. It was Mrs. Tweedie who speculated upon my meeting with Nansen, a couple of years before it took place, in a preface to *A Girl's Ride in Iceland*. I proposed the following toasts:

"Her Majesty the Queen."

"Mr. and Mrs. Harmsworth, Mr. Montefiore, and all our friends."

"Dr. Nansen, Johansen, Sverdrup, and the party on the *Fram*."

Armitage proposed my health, to which I responded, and drank to all the members of the party.

Armitage and the doctor sang several songs, Wilton regaled us with one or two of Russian origin and a dance, and Heyward gave us a Spanish one with a remarkable chorus.

We kept it up until 3.30 A.M., and altogether spent a very jolly evening.

Wind, E. 4. E. by S. 5. E.S., E.S.E. 7 to 8. Sky clouded $\frac{3}{4}$ ths at 8 A.M., overcast the rest of the day. Snow after 4 P.M. and mist.

December 26th, Saturday.—As some of the dogs have got out of condition and we are out of bear-meat, which I have been using sparingly (we have now fifteen dogs, five bitches, and fourteen pups), I am using tinned meat for them, giving those that most need it two pounds a day and the others one pound, with as much Spratt's biscuit as they will eat. It is extravagant feeding them on tinned meat, but I must at all cost keep them in good condition for the spring sledging, and these dogs have always been used to an entirely carnivorous diet. The long darkness is very trying to them. I wish a few bears would turn up, as we want meat. We and Nansen together, I fear, have much thinned them.

A THOUSAND DAYS IN THE ARCTIC

I to-day made muzzles for the dogs in the worst condition, to prevent their killing each other, and have let them run loose, which will help to improve them.

December 30th, Wednesday.—We are all very busy with preparations for spring sledging; one man is sewing a tent, another making jumpers, a third dog-traces. Our room has quite the appearance of a factory workshop.

The barometer fell to 28.76. Wind E. 2, N.N.E. 4, N.E. 5, E. by S. 5 to 6. Sky clouded at 8 A.M. $\frac{1}{10}$ ths. Noon $\frac{1}{10}$ ths. Overcast the rest of the day, with very dense mist all day and heavy snow after noon.

A swell can be heard this evening breaking upon the floe edge. Thermometer rose to $+15.5^{\circ}$ at 4 P.M.

CHAPTER XXVII

WE PREPARE AGAIN FOR SLEDGING

January 1, 1897, Friday.—We had our usual “festival dinner” in the evening, with mutton and fiz, Armitage’s plum-pudding, most kindly sent out by his father, followed by punch and song during the evening, and this ends our Christmas fare. Back we go to bear, monotony, and work.

A piece of these much-prized sheep is the only civilized meat food we of the old brigade have tasted for nearly three years. The peacocks’ tongues and other delicacies of the Roman Emperor’s board could not have tasted more delicious than did these very tough Norwegian sheep to us, and a glass of champagne once in twelve months becomes indeed the nectar of the gods.

January 6th, Wednesday.—A clear, fine day, with a good deal of glow in the sky to the south about noon. Every one feels in the best of good spirits in fine weather; it bucks every one up.

Wilton and I went for a run on ski to the top of the east glacier; the others went west, not relishing the fast run down the glacier in the dark.

Wind S.E. 3, S.E. 4, E.S.E. 3. Sky clouded 0 to $\frac{1}{10}$ ths. The wind was blowing from N.N.E. on the east glacier.

January 8th, Friday.—Blowing from a moderate to a fresh gale from east to southeast-by-east. After noon it became overcast and misty and snow fell.

I took my usual bad-weather walk round and round the pond, and all the others went as usual for the daily constitutional. In darkness and storm it is very like a treadmill, this enforced exercise, and all are glad when it is over.

Armitage worked at the canoe. Wilton helped me with the tent. The doctor worked at a woollen jumper I am showing him

A THOUSAND DAYS IN THE ARCTIC

how to make for sledging. I find that loom-meat in frying loses 37.5 per cent. in weight, which means that it must have about 50 per cent. of the water driven off, as it takes up fat in cooking, which adds to its weight. I am having meat cooked daily for sledging, then weigh it out, tie it up in ration bags, and place in out-of-doors to freeze.

Winds E. 7, E. by S. 7, S.E. by E. 7 to 8. Sky after noon overcast, with mist and snow; up to noon was clouded from $\frac{3}{10}$ ths to $\frac{3}{10}$ ths.

January 11th, Monday.—Hearing at breakfast a row in the dog-house, I sent out to ascertain the cause, and learned that



FRAMEWORK OF CANVAS CANOE (BY MOONLIGHT)

"Lurcher" had been killed by "Bismarck." I found on examination that these two had been tied up too near each other and could reach each other. I rearranged all the dogs at proper intervals, and wired up their chains so that they cannot easily be moved or placed too close again. "Lurcher" was a capital sledgedog. It is very tiresome. These dogs are a constant source of anxiety to me, and I feel a relief each morning on hearing all is well with them and that no dog has been killed during the night.

I took out the half-plate and hand-cameras and took three

WE PREPARE AGAIN FOR SLEDGING

negatives beyond Sharpe's Rock, as the moon was bright. I then went for a ski-run to the top of the east glacier, which has been much cut up by the easterly gale, and the snow is in deep, hard furrows and high ridges. On my return, seizing the opportunity of a fine day and of being able to reach the open water, Bruce and I took down the tow-net and dragged it up and down for two hours near the large berg. Among other things we got a new shrimp. A small species of shrimp (similar to some the doctor and I got away east some weeks ago) came out of the water beautifully efflorescent and remained so for some hours. I have requested Bruce not to go near the open water in the dark unless I am with him. The others went for a ski-run on the plateau for exercise. Armitage tried an observation for longitude (absolute) with a moon-culminating star, but the sky became overcast and stopped it. He went on with the canoe. The doctor worked at the jumpers. Wilton weighed out tinned meat for the dogs when sledging.

Winds N. by E. 2 to 3. N. by E. 1 to 2. Calm, E. by N. 1. Sky clouded $\frac{1}{8}$ ths to $\frac{1}{4}$ ths. Misty after 6 P.M., and clouded over from the eastward.

January 14th, Thursday.—At three o'clock this morning I was roused by "Nimrod" yelling "Bear!" at the top of his voice. All the others were asleep and heard nothing. I slipped on some boots, and putting a coat over my pajamas and taking my rifle I went out. At first I could see nothing, owing to the thick overcast weather, with a fresh easterly wind driving snow before it, and snow also was falling thickly, but on going round the barometer-shed a big yellow object came full tilt at me. At a distance of about six yards I fired at his head end (I could not clearly distinguish it as it appeared merged in his body), and he dropped suddenly as if shot through the brain, but, to my surprise, on the effect of the flash of light clearing away I saw him pick himself up and make off to the right of the flag-staff, so I fired again after him. I at once loosed "Nimrod," and went back into the hut for a pair of mitts and a lantern to follow his tracks, as the noise of the wind and driving snow prevented my following by the sound of "Nimrod's" barking. I tracked him down the slope and across the floe for some distance towards the big berg and open water, but lost his trail on a wide extent of hard, level, wind-swept floe, and as I could hear no sound of the dogs, I had reluctantly to

A THOUSAND DAYS IN THE ARCTIC

return to the hut. At 6 A.M., hearing a great racket among the dogs, I guessed that the two bear-dogs, "Nimrod" and "Misere," had returned from their hunt and were having a difference of opinion upon professional matters. I got outside the hut just in time to rescue "Misere" from being killed—he was muzzled, whereas "Nimrod" was not. I tied up "Nimrod" and brought "Misere" into the hut for the night, and gave him some rum to pull him together. He had had a near squeak. They are fearful dogs for fighting!

Winds S.W. 1 to 2, N.N.W. 3, W. 3. Overcast and misty all day except at 4 P.M., when the sky cleared $\frac{2}{10}$ ths, and the mist lifted. At 8 P.M. it was snowing.

January 16th, Saturday.—Overcast and misty all day after 8 A.M. I went for a ski-run up Windy Gully, and on my return was told that the others had shot a bear just outside the house some time before, and were now away to the westward. He had run west some distance badly wounded and had been finished there. Armitage, the doctor, and Wilton did the shooting. I am told that the bear (a very large male seven feet five inches from nose to root of tail) showed considerable boldness and went for one of them when they approached, and again after being wounded faced about with the intention of charging. We sledged him up to No. 2 hut, where we skinned him. I am very glad to get him, as we were without bear-meat. I then developed a number of negatives recently taken. Armitage worked out yesterday's longitude observation.

Winds E.S.E. 4, E. 5, E. by S. 4 to 5, E. by S. 3. Misty all day. Overcast after 8 P.M., then sky $\frac{2}{10}$ ths clouded; snowing at noon. The mist was very wet after noon, coating everything with ice.

January 20th, Wednesday.—I, in common with the others, have been much troubled with sleeplessness. They all look rather pale. Darkness has a greater effect upon health than most people imagine. Sleeplessness affects the general health. Even the sleep one gets seems to be unrefreshing, and we get up feeling drowsy, and with headache in the morning, but quite unable to go to sleep. I have taken sulphonal once or twice, but don't care to do so often, as its effect is as yet, I believe, unknown, and may be injurious.

WE PREPARE AGAIN FOR SLEDGING

January 21st, Thursday.—Wilton brought "Snark" into the house, saying that his tail had been frozen to the ice and he did not seem well. I found on examination that he had some nasty wounds on his hind-quarters, caused by "Pincher," no doubt, at the same time as "Lurcher" was killed. I cut off the thick hair around the wounds, which hid them and accounted for nothing having been noticed before, and washed them out and sent for the doctor, who put some antiseptic dressing upon them. The dog is off his feed, is feverish, and the wounds smell badly. He is our best sledge-dog. I am keeping him in the hut until he is better. The weather has been bad all day. Misty throughout, and overcast in the morning, and blowing in gusts of gale force (7) all day, and a steady gale in the evening from east-by-south, backing to northeast and east. I took some exercise around the pond, and the others did the same at the back of the hut. Arm-itage worked at the canvas for the canoe. He is proving most efficient at the job. I went on with the tent, Wilton with the dog-meat. The doctor worked at the bear-skin.

Winds E. by S. 2, N.E. 1 to 2, E. 2, E. 7. Gusts all day, sometimes shifting to northward, of forces 4 to 9.

I began an experiment on "Joey" to-day, feeding him on five ounces per day of a concentrated food, the pet child of a well-known food specialist, and weighing him daily. Ten ounces is said to be sufficient food for a man at hard work.

January 22d, Friday.—A clear, fine day for a change, but with a lower temperature—22° below zero, and enough wind to make it very cool. There was a good deal of twilight at noon to-day.

Many tracks of bears were visible even near the hut, showing that if we had good bear-dogs we should have got more. Poor old "Räwing's" death is a sad loss to us.

Winds E. 2 to 3, E.S.E. 2, E.S.E. 4, S.E. by E. 2. Sky clouded $\frac{1}{16}$ th to $\frac{1}{8}$ ths.

"Snark" died last night, apparently of septicemia.

Winds S.E. 0 to 1, E. 0 to 1, S.E. 0 to 1, N.N.E. 0 to 1. The sky cloudless all but 0.5 all day. The mercurial barometer registered at 8 P.M. 30.921 (uncorrected to sea-level). The barometer has been above thirty inches since 8 A.M. on the 25th.

A THOUSAND DAYS IN THE ARCTIC

January 28th, Thursday.—Another beautifully clear, fine day and with consequently a good deal of twilight. I went for a run on the floe to the east and the others went in the same direction some time before me. Sounds carried a very long way to-day, and I distinctly overheard a conversation at a distance of over half a mile from me, between two of my men conducted in an ordinary tone. They were immensely surprised when, on our return to the hut, I repeated what had been said.

I began work upon my canoe in preparing it for sledging. Armitage worked out yesterday's astronomical observations. Wilton sewed sledge-sails. The doctor went on with the tailoring, at which he is excellent.

Winds N.W. 0 to 1, N.N.E. 0 to 1. Calm. Sky clouded 0.5 at noon. Cloudless the rest of the day. Barometer began to fall after noon. Barometer at noon 30.972 (uncorrected to sea-level).

January 30th, Saturday.—I found this morning that "Misere" is rapidly losing the hair round his neck where "Nimrod" bit him some time ago, and is off his feed.

I fetched him into the hut, and the doctor and I put some dressing upon it and bandaged it up in flannel to keep it warm. I then tied him up with a chain round his loins like a monkey, as a collar cannot be put round his neck without chafing, and he must be tied up or more rows will result.

As there appears no means of effectually stopping the fighting among the dogs, even by the utmost watchfulness and care, I mean to try what nipping off short the canine teeth, which are those with which the damage is done, in the present and future pups will do. Although I hardly like doing it, some means must be found to check fighting, or we shall lose all our dogs soon. I sincerely hope ponies will be sent next summer—or, at all events, more dogs.

February 3d, Wednesday.—Misty until afternoon and the sky clouded from three-tenths to four-tenths. It then cleared. Temperature still low. Owing to the high tides there has been, both about noon and this evening, a good deal of ice-pressure to seaward, and the air has been filled with groans, shrieks, and whistles, varied by rumbling sounds like a distant heavily laden train. I went for a ski-run to seaward beyond Bear Berg to get

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a view of the ice-pressure, and then struck across towards Cape Gertrude. The others also went out on the floe.

I have given out fur "finsko" to the members of the party, as the weather is now a trifle too cool for leather "laipeshko."

I went on with the canoe and then washed clothes, being occupied with them until after midnight. Armitage sewed the canvas canoe. "Daisy" gave birth to pups this afternoon.



A SKI PARTY

Winds N.E. 0 to 1, E. 1 to 2, W.N.W. 2, E.N.E. 2. Sky clouded 0 to 4ths. Misty until after noon. The barometer has been falling during the last two days until 4 P.M. to-day (30.200 at 8 A.M. of 2d, 29.909 at 4 P.M. to-day), when it began to rise.

February 8th, Monday.—As soon as I had finished my usual morning's work I ascended the talus by cutting steps in the hard snow, and after some trouble succeeded in getting down two of the pups, which had gone up there and were afraid to come down again. I then set to work to try and find the third. I cut steps over several shoulders but saw nothing of it, and as darkness came on while I was up there I had to give up the search and come down. On arriving at the hut to my annoyance I learned

A THOUSAND DAYS IN THE ARCTIC

that two more pups had gone up the talus, and that the one I had been searching for had come down on its own account early in the day! I must try again to-morrow to fetch them down. I am now keeping all the small pups in the stable, day and night, as I have something else to do beside climbing the talus after them, which is not pleasant work either at this season, and a slip would smash one to pieces.

There is only a narrow stream of open water visible, running east and west, about two miles off Flagstaff Point, and beyond that to the horizon (thirty miles distant), apparently a mixture of floes, broken up, and light bay ice.

After tea we packed up sledging provisions, and Armitage worked at the canoe.

Winds N. 3 to 4. N.E. 3 to 4. N.E. 5. Sky clouded 0 to $\frac{1}{10}$ th.

February 9th, Tuesday.—We went on packing up provisions for sledging, and I added three more bamboos to the tent-frame. I fear the four alone will not withstand some of the gales we are likely to meet with when sledging. During the last two years I have for an hour and a half every night, after turning into my blankets, read some scientific book. I am now engaged reading Darwin's *Origin of Species*, which I have only read once before and is a work that requires studying.

Winds S.E. 0 to 1. N.W. 1, W.S.W. 1, W. 2. Sky clouded $\frac{1}{10}$ th to $\frac{1}{10}$ th. Snowing (fine) at 8 P.M.

February 11th, Thursday.—This morning at noon, believing that I could hear yappings from the top of the talus, I sent Armitage with a glass round the foot of it to see if he could make out the missing pup. He returned, saying that he could see it on the summit of a high shoulder, under the rocks to the eastward, six hundred feet up. As soon as I had finished breakfast I started off with ice-spikes and ice-axe, and by cutting steps in the steep hard ice-slope, managed to reach it, but found it in a very bad way. I brought it into the hut and fed it on some meat extract and milk, and tried to give it some whiskey. It was, however, seized with a tetanic-like convulsion and died. The poor little beast was frozen down when I found it and had got very thin.

Armitage took an observation for moon-culminating star for absolute longitude:

WE PREPARE AGAIN FOR SLEDGING

	E. Long.	
December 29, 1895	49° 44' 37"	Moon-culminating star.
August 16, 1895	50° 01' 44"	Lunar.
April 18, 1896	49° 39' 15"	Lunar.
February 11, 1897.	49° 28' 19"	Moon-culminating star.
Mean	49° 43' 20"	

Latitude for meridian altitude of star B Tauri, February 11, 1897, 79° 55' 58" N. latitude.

The fine, clear, calm, cold weather still continues, and we all find it a delightful change from the usual climate here. The minimum thermometer has registered 39.5° F. below zero for the last twenty-four hours.

Wind calm all day. Sky clouded $\frac{1}{8}$ th at noon. Clear the rest of the day.

The temperature has been low during the last few days, the minimum for the 12th registered 50 $\frac{1}{2}$ ° below zero, and the wind increasing from the northeast to a fresh gale on the 13th, with a temperature varying between 44° and 50° below zero, has made it bitterly cold.

The gale blew throughout the night, and in spite of our efforts to keep up the warmth of the hut the temperature fell uncomfortably low, and at 8 A.M., at three feet from the floor and eight feet from the stove, which was well stoked, the thermometer registered 6° of frost. Nails, etc., at a short distance from the stove, driven into the wall, are coated with ice, and the northeast wall of my cabin is quite white from the same cause, and a perfect glacier runs down the wall from my breath condensing on it when asleep. I have had all the loose dogs brought into the hut, and all the animals under cover. We have now five dogs encamped in our room. I went out for a walk for two hours with a wind-guard on; all the others consider the inside of the hut the best place, in which I daresay they are right, but I dislike being kept in by anything.

At 8 A.M. the temperature had risen to 37° below zero, but the northeast gale still continues to force 8. It had moderated by noon to a moderate gale, and the temperature rose four degrees more. At 6 P.M. the wind quickly fell to a gentle breeze at 8 P.M. from west by north.

About noon Wilton, who had shortly before gone out to the

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stable, ran in to tell me that a large bear was just outside the stable door, and was threatening the pony and dogs, which he had just let out for a short run. I seized my rifle and ran out and found Wilton, who had preceded me by a few seconds, very pluckily "standing by" the stable to create a diversion in case the bear should collar any of the animals, and was only about twenty yards from him. I ran up and put a bullet through "Mr Bruin's" head and settled him at once. The pony was coolly standing about ten paces off, looking at him and showing no fear. I wish she would realize that bears are not nice or desirable acquaintances; but she doesn't a bit. "Daisy's" pups were barking around him, and fortunately distracted his attention, as he was engaged in making rushes at them. They are becoming great sportsmen.

I praised Wilton for his pluck in standing by his farm in danger. All the dogs were in the hut but the puppies.

I photographed the bear, and we sledged him into No. 2 hut and flensed and cut him up. We found it difficult to see to this, even with two lamps, owing to clouds of steam rising from the carcass and ourselves in the cold temperature, and at times could barely see each other a yard away. It looked like a land dry in full swing. I am very glad to get dog-meat. After skinning the bear every one amused himself as he liked.

Winds N.E. 8, N.E. 7, W. by N. 2. Sky clouded 0 to $\frac{1}{10}$ ths. Misty and after 2 P.M. Temperature rose to 29° below zero at 8 P.M.

February 17th, Wednesday.—I developed the negatives of the moon taken last night, and then made another dog-trace of canvas. Armitage went on with the canoe. The doctor worked at the gabardine cover for my breeches. Wilton weighed out and packed up dog-meat. Armitage has been anything but well during the last week. A tooth has been bothering him, and he is generally out of sorts. The others are now looking well, and every one is sleeping better. Even the twilight we have had about noon for some days has improved every one's health, although when the first light began to make itself manifest, it seemed to have an adverse effect upon all for a few days. I have noticed similar effects during each of the three springs we have been here.

The dimensions of the new canoe, which is nearly finished, are:

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Length along keel, 10 ft. $7\frac{1}{2}$ in.; length along deck, 11 ft. $9\frac{3}{4}$ in.; length along bows, 1 ft. 8 in.; length along centre ribs, 1 ft. $2\frac{1}{2}$ in.; length along bottom pieces, $10\frac{1}{2}$ in.; diameter of manhole, 1 ft. $9\frac{3}{4}$ in. fore and aft, 1 ft. $10\frac{1}{4}$ in. athwart ship; depth at centre, 1 ft. $3\frac{1}{2}$ in. (from top of manhole to keel).

Armitage has made a capital job of it, and has turned out our new and rather strange-looking craft in a most workmanlike manner. I think she will answer admirably for sledging. Her weight is 60 lbs.

February 19th, Friday.—Blowing hard all night, and with furious gusts, which continued more or less all day, with driving



THE END OF THE HUNT

snow and mist. The low temperature of 36° below zero renders the wind rather nippy. I went for a walk on the plateau to the westward, where it was a trifle sheltered from the high gale. The doctor, Wilton, and Armitage also went out for a short time.

I went on with the canvas dog-harness. Wilton made bags for the dried vegetables I have been keeping for the pony's food while sledging. Armitage worked at the canoe. The doctor worked at Armitage's jumper.

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I have been very careful that none of the looms that are in the least degree high shall be eaten by us. Through the winter either the doctor or I have carefully examined all loom-meat before it is cooked. We also examine all tinned meats before they are used ; we have to be very careful. We have kept scurvy at bay up to the present, and with proper care shall, I trust, do so.

February 20th, Saturday.—We only have now breakfast, tea (with a little bread or biscuit and butter) about 3 P.M., and dinner at 7.30 P.M. We have dispensed with lunch, as we find that during the winter we don't need it. Just before we had tea Wilton ran in to say that a bear was by the pond making rushes at the pups which were out there. I ran out with my rifle, but the bear was then on the middle of the pond and the pups were in no immediate danger, I went back into the hut and called Armitage and the doctor so that they might share the sport. We then went out and found "Mr. Bear" close to the observatory, and as he made one or two dangerous rushes at the pups and nearly caught one, I put a bullet into him, as he stood and glared at me which literally passed up his nose, knocking out an upper canine tooth on its way. He rolled over and then rose and staggered off, but a second shot from me in the neck, and one from Armitage following my first shot, knocked him out.

We sledged him into No. 2 hut and skinned and cut him up. He was a small he-bear and very lean. He was, however, as active as a cat, and rushed about in a very brisk manner. I am leaving this skin to freeze, and the doctor will attend to it after we have left for the sledge journey. Only a small piece of canvas was found in the stomach.

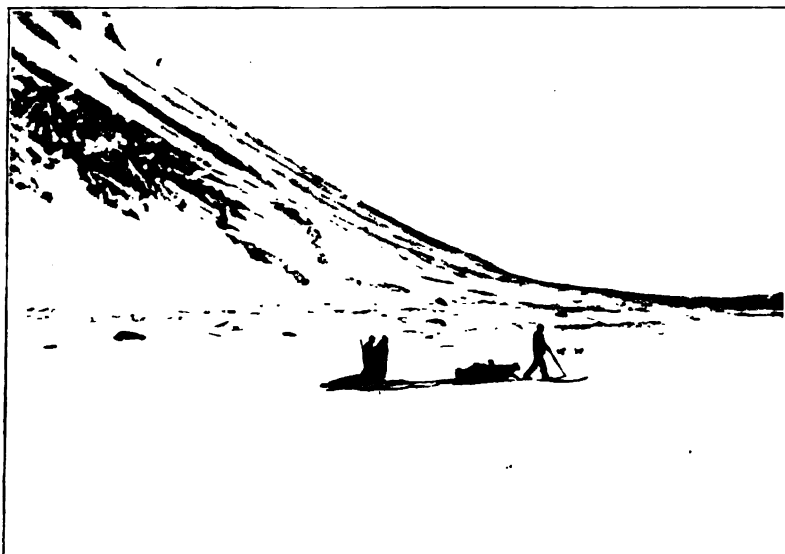
Winds N.E. 8, N.E. 7 to 8, various 1, N.E. 7. Sky clouded $\frac{1}{10}$ th to $\frac{1}{10}$ ths. Misty at 4 P.M.

February 22d, Monday.—The morning opened calm and clear. The sun rose after our long winter night, the upper limb showing above the horizon at 11 A.M. We welcomed him with joy, which no one but those who have been deprived of light for four long dreary months can in the least appreciate, especially after four Arctic winters in succession which I have now experienced, three being spent here. Next winter will make five. Quite a procession to the plateau was formed to see his friendly

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old face appear again in the sky, to watch him rise, little by little, above the ice-bound sea and band of frost-smoke on the southern horizon. Our gloomy, deathlike polar night is over, and we all stand well and full of vigor to welcome the return of life and brightness.

I took the half-plate camera and went some distance up the talus, and obtained a number of negatives of the scene. The blendings of color were very striking—gorgeous hues of rose,



"WE SLEDGED HIM INTO NO. 2 HUT"

orange, pink, and purple being predominant from west, through south to east, and towards the north the sky had a steel-blue appearance near the horizon, becoming paler blue towards the zenith. The sun rose about three-fourths of a degree and sank about 1 P.M.

The results of my experiments upon "Joey" with the "concentrated" food show that it does not come up to what is claimed for it. The dog was chained up and muzzled all the time to prevent the possibility of his getting extra food, and I carefully weighed him every morning before feeding him. He

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took the food readily at first, but towards the end of the experiment very reluctantly, and on the three last days* I had to put about half of his allowance down him. He got very thin, but otherwise appeared in good health. During very cold weather he was kept in the stable, which is warmer than the dog-house.

It is claimed that ten ounces per day will enable a man to work hard and keep in good health in the Arctic. I have no desire to try it upon ourselves when on a sledge journey.

Weight Concentrated				Weight Concentrated			
		of Dog	Food			of Dog	Food
		Lbs.	Oz.			Lbs.	Oz.
January	24th . .	38½	5	February	6th . .	31	7½
"	25th . .	37½	5	"	7th . .	31	7½
"	26th . .	36½	5	"	8th . .	31	7½
"	27th . .	36	5	"	9th . .	30	7½
"	28th . .	34½	5	"	10th . .	29	7½
"	29th . .	34	5	"	11th . .	29	7½
"	30th . .	34	5	"	12th . .	28½	7½
"	31st . .	33	5	"	13th . .	28	10
February	1st . .	32	5	"	†14th . .	28	10
"	2d . .	31½	7½	"	†15th . .	28½	10
"	3d . .	31½	7½	"	16th . .	28½	10
"	4th . .	31½	7½	"	†17th . .	28	10
"	5th . .	31½	7½				

February 25th, Thursday.—As I have only fifty-two pounds of oats, I am obliged to take Spratt's dog-biscuits in the place of them to use with the dried vegetables I have saved for "Brownie" when sledging. These are excellent dog-food, but the proprietor would hardly recommend them for horses!

I went on making dog-harness. Armitage made a green canvas bag for his sledging kit. The doctor finished the jumper for Armitage. Wilton weighed out and packed up dog-biscuits for pony-food when sledging.

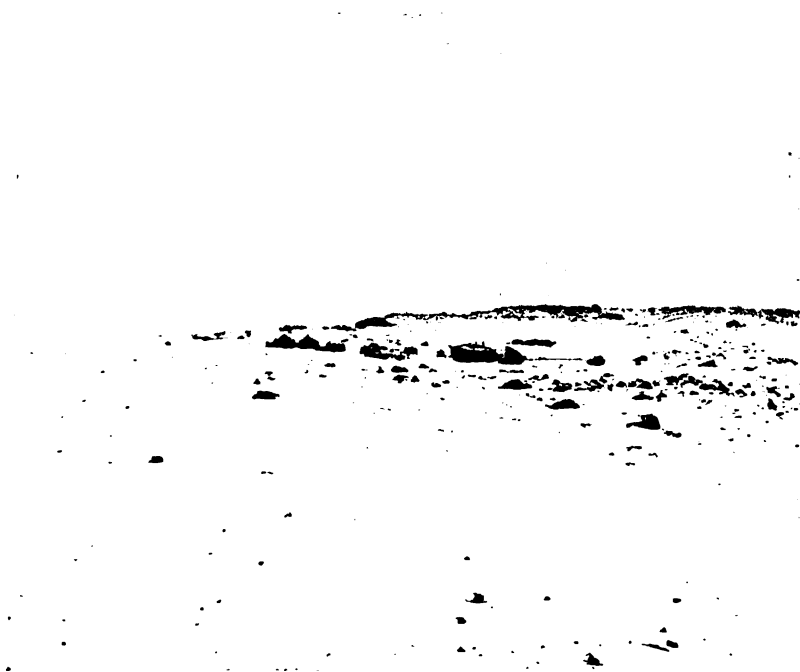
After breakfast we covered over the southwest window of the hut, which is very thickly coated with ice, so that it nearly excludes all light, with four thicknesses of reindeer-skin externally and piled snow up against it to enable the warmth of the room to overcome the external cold and melt the ice off.

* Omitting the last day but one.

† Had to be forced to eat the allowance

WE PREPARE AGAIN FOR SLEDGING

February 28th, Sunday.—This morning Wilton and I went to the top of Cape Flora, as I wished to examine the self-registering thermometers I had placed there last autumn. I found the minimum showed 63° below zero, and the maximum $+20^{\circ}$. As there is a difference of as much as twelve degrees between the minimum registered here throughout the winter and the one on the



SUNRISE AFTER THE LONG POLAR WINTER (FEBRUARY)

summit (about 1000 ft.), I think there must be an error on the instrument, although last October it agreed with our standard thermometers. I shall compare it with others when it is brought down. I am leaving the thermometers, after re-setting them, on the summit for a month or two longer.

March 3d, Wednesday.—Two of "Miss Råwing's" pups were found dead this morning, now leaving only one. The odd, tire-some little beast kills and eats them in spite of all our care.

I see a report in the *Weekly Times* of April 24, 1896, of the

A THOUSAND DAYS IN THE ARCTIC

discovery of a method of color photography by M. Lippmann, which appears to only require a mirror of mercury behind the plate in the dark slide in addition to the ordinary methods of procedure. I intend to cut up for the purpose a looking-glass brought up from the ship and try it, although I don't quite see how it is going to act.

We want another bear badly for dog-meat, for during the last two days we have been without any, and they have been having tinned instead.



WILTON EXERCISING THE DOGS

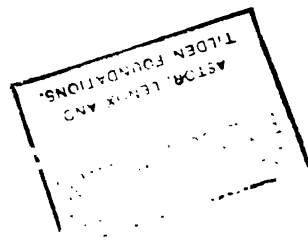
Winds N. 1 to 2, W.N.W. 1 to 2, N.N.W. 1. Calm. Sky clouded $\frac{1}{4}$ to $\frac{1}{8}$ ths. Snowing (fine snow) and misty at 8 P.M.

March 8th, Monday.—None of us went for our usual walk today, but only took a few minutes' exercise near the hut, as I am very anxious to put in every minute we can in making preparations to leave for the sledge journey.

I did a variety of odd jobs—made muzzles, fixed up furs, etc and then went on with my work at the canoe. Armitage spent the day fixing up his militza. Bruce finished my jumper-bag, and then I set him to work to remove the glasses from our goggles and to insert black kid with a slit in it in place of them. This



EAST END OF CAPE FLORA IN MARCH



WE PREPARE AGAIN FOR SLEDGING

think will be an improvement in case we want to use them. Wilton let pieces into the sleeves of my militza. The doctor finished the gabardine covers for Armitage's breeches, and washed out some woollen stuff to make mitts, etc., from.

All are working with most hearty good-will to enable us to get off quickly, and we kept at it until after eight to-night without any break except a few minutes to have tea and bread and butter at 3 P.M. There is a popular impression that people in the Arctic live a life of hibernation during the winter. That certainly is not the case with us; we are always busy, and the time seems too short to enable us to do all we wish to. Having plenty to do keeps us happy, contented, and in good health, and that, combined with regular exercise and a proper care as to wholesome food, is the secret of passing the long, dreary months of polar darkness in health and happiness. Work is a saving clause in our lives.

I finished and lashed the chocks, made of cork and reindeer-skin, upon the 11 ft. 6 in. sledge to carry my canoe. We are very glad to be free of canoes in the hut, which have taken up much of our very limited space for over a month past. One had been slung across the room after being tarred, and our heads have constantly been coming in contact with its very sticky sides, causing much laughter and endless jokes. Wilton gave me a hand with the canoe. Bruce began a cover of gabardine for the fur-bag I use for dark slides. The doctor began some gabardine covers for our fur mitts. Armitage finished washing his clothes and repairing his militza.

March 13th, Saturday.—I continued my work at loading up the sledges, and by seven o'clock had got six packed and under the sail-tenting on the thaw-water pond ready to start. I shall have a few finishing jobs to do to-morrow, and I intend, unless the weather is very bad, to start on Monday.

LIST OF PROVISIONS FOR TWO MEN •FOR A WEEK

Tea, 1 lb.	Biscuits, 14 lbs.
Cocoa, 1 lb.	Cooked loom-meat, 14 lbs.
Sugar, 4 lbs.	Butter, 1 lb. 6 oz.
Soup, 1½ lbs. Bospur, 7 tins.	Concentrated meat-juice, 2 lbs. 2 oz.
Lentil, 3 lbs.	Cheese, 2 lbs. 11 oz.
Lard, 1 lb.	Bacon, 3 lbs. 8 oz.

A THOUSAND DAYS IN THE ARCTIC

NO. 1 BAG CONTAINS IN ADDITION—

Salt, 2 lbs.	Candles, 10.
Pepper, 4 oz.	Flags (jacks), 4 (for cairns).
Spoons, 2.	Frying-pans (aluminium), 2.
Tomahawk, 1.	

NO. 4 CONTAINS ALSO—

Salt, 2 lbs.

Weights of Ration Bags

	LBS.		LBS.
No. 1 bag	63	No. 4 bag	55
No. 2 bag	54	No. 5 bag	54
No. 3 bag	54	No. 6 bag	55

Weights on Sledges

NO. 1 SLEDGE

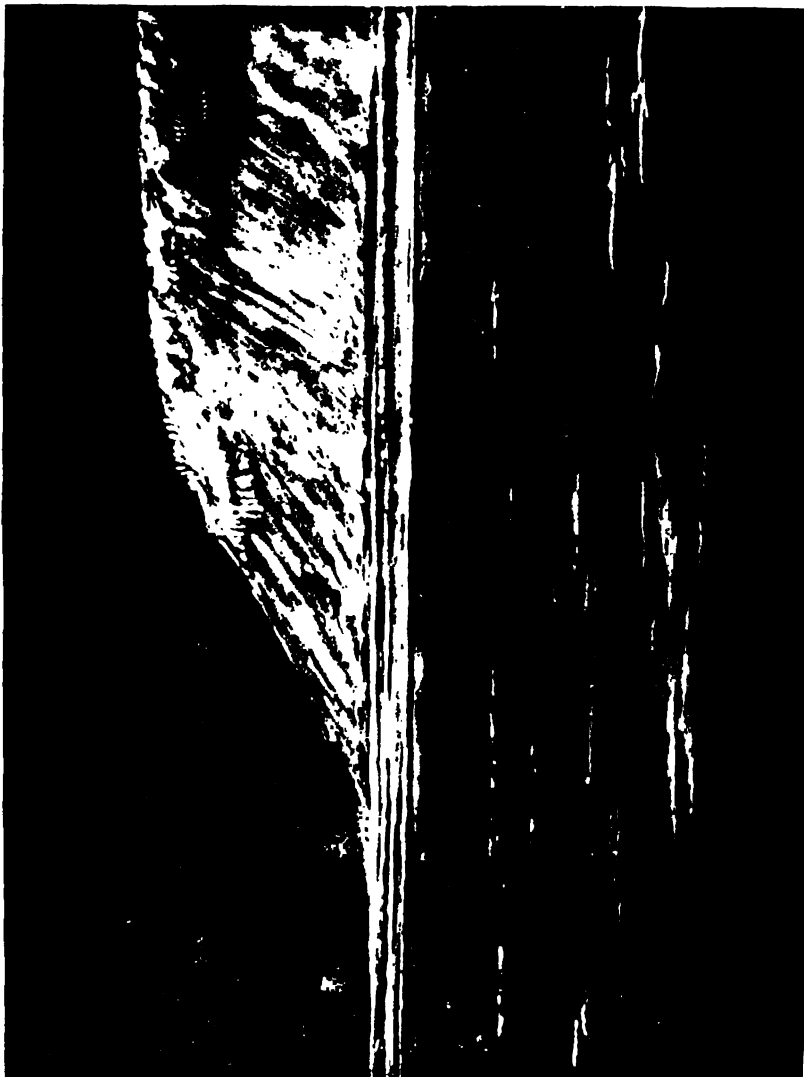
	LBS.		LBS.
No. 1 ration bag, etc.	66	Tinned dog-meat (wrapped in 1 lb. lots in paper)	50
No. 2 soviek, etc.	24	Pony's gear	10
No. 2 skin-breeches	8	Tent, poles, etc.	30
Bag of dried vegetables	24	Shovel	4
Dog-cakes	50	Two kit-bags	25

NO. 2 SLEDGE

Canvas canoe and gear, 65 lbs.	Raper's tables.
Gun in case, 9 lbs.	Scribbling-book.
Militza, 10 lbs.	Paddle.
Tinned dog-meat, 50 lbs.	Sail and mast.
Artificial horizon.	One tin whiskey.
Thermometers (case).	One canteen.
Aneroid.	

NO. 3 SLEDGE

	LBS.
Ration bag No. 2	54
Ration bag No. 3	54
Ration bag No. 4	55
Ration bag No. 5	54
Ration bag No. 6	55
Tinned dog-meat (wrapped in paper in 1 lb. lots)	50



WEST END OF CAPE FLORA IN SPRING

THE
LIBRARY
OF THE
UNITED STATES
DEPARTMENT OF
THE ARMY
WASHINGTON, D. C. 20315

WE PREPARE AGAIN FOR SLEDGING

NO. 4 SLEDGE

	LBS.
Oats, 52 lbs. }	
Dog-cakes, 66 lbs. }	
5 bags of dried vegetables of 28 lbs. each	118
1 bag of dried vegetables	140
1 bag of dried vegetables	56
1 bag of dried vegetables	28

NO. 5 SLEDGE

11 tins of 1 gallon of spirit (11 lbs. each)	121
1 bag of tinned meat (for dogs)	45
1 bag of tinned meat (for dogs)	72
1 bag of tinned meat (for dogs)	62
1 bag of dried vegetables	28

WEIGHTS

LBS.		LBS.
313½	} pony	141
185		314
322		328
820½		783

NO. 6 SLEDGE (11 FT. 6 IN.)

Birch-bark canoe (decked in), 75 lbs.	Bacon for lunch.
Rifle, in case, 9½ lbs.	Cheese.
Camera (half-plate), etc., 12 lbs.	Prismatic compass.
Bag of dark slides.	Telescope.
Changing bag.	Stand (camera and prismatic compass).
110 half-plate films.	Hand-camera.
100 hand-camera films.	Paddle.
Crow-bar, 4½ lbs.	Sail and mast
Cartridges (12 bore), 7 lbs.	Lantern (Beresford).
One gallon spirit, 10 lbs.	Sextant.
Canteen (with two quart pots), 8 lbs.	Two knives and steel in bag.
Militza, 10 lbs.	
Bag of biscuits.	

Nos. 1, 2, 3, 4, and 5 sledges measured 9 ft. 6 in.

I am giving the pony six pounds of dried vegetables and four pounds of either dog-cakes or oats daily. To the dogs I give one pound of tinned meat to each daily. Both the pony and dogs

A THOUSAND DAYS IN THE ARCTIC

are in first-class condition, and have fully rewarded my efforts to get them fit. The dog-team is, however, a weak one, and out of the twelve dogs two are entirely new hands and three are weak animals.

The weather is warm, misty, and snowing—bad for sledging.

Wilton did some odd jobs and helped me to load up. The doctor started to make gabardine covers for our mitts. Armitage did various odd jobs and lashed on the canvas canoe.

Winds calm all day, with force 2 at 8 P.M. Overcast and misty all day until 8 A.M. The wind was varying to N.E., but there was a sound in the cliff-tops of a southerly wind, and cirrus-cumulus clouds have been moving from S.W. over the moon.

I heard roches up in the cliffs of Cape Flora to-day. It is pleasant to have the long winter silence broken again by the familiar cries of birds.

I intend to proceed up the British Channel round the northern shores of the western land, and make out its extension to the westward. We know not the extent of it or the direction the land takes beyond Cape Mary Harmsworth. To determine the extent and position of Gillis Land, if such a land exists, mapping in all country seen *en route*, and returning round Cape Mary Harmsworth and the western-southern coast to Cape Flora. In the spring of 1898, having practically mapped in what remains of Franz-Josef Land, I intend to push north *via* the east coast of Crown Prince Rudolf's Land, to explore the sea to the north of Franz-Josef Land to the west of Nansen's route, and attain as high a northern latitude as possible. I trust by then to have draught-power much increased by ponies by the ship this coming summer.

CHAPTER XXVIII

QUEEN VICTORIA SEA AND THE NORTHWEST



DRESSED FOR SLEDGING

March 15, 1897, Monday.—An entire change in the weather. Clear, strong wind from northwest, and the thermometer down again to 19° below zero at 8 A.M.

We hurried up and got the sledges down on to the floe, and got away, making for Windward Island. All the members of the party accompanied us, so as to help us on our first

day's journey with our loads. The animals started well, but soon began to flag; and we had great trouble to get both the pony—our last remaining one—and dogs along. We are very short of draught-power.

We stopped for lunch about midway between Cape Flora and Windward Island (the thermometer standing at 30° below zero), and then pushed on again over level floes, but very deep with snow, so that I was obliged already to put the pony into the snow-boots I have made for her. We all use ski.

A THOUSAND DAYS IN THE ARCTIC

We camped about 8 P.M., after ten hours' going, about half a mile to the south of Windward Island, where we came upon hummocks; the animals were fairly done up, owing to the snow lying deep, making the going very heavy. The thermometer had then fallen to 40° below zero (a fall from $+24^{\circ}$ at 8 P.M. last night, or 64° within twenty-four hours). All the rest of the party then started back for Cape Flora. I thanked them all for the way in which they had helped me in getting through the sledging preparations, and their hearty and cheerful co-operation in the work of the expedition generally. They gave us three cheers and an extra one on leaving, and expressed their best wishes for a successful journey. Armitage and I were then left alone to proceed on our third year's journey. A breeze sprang up in the course of the evening, making 40° below zero a bit cool.

I muzzled all the dogs, knowing their propensity for killing one another and gnawing their harness, and left them in the traces with the hauling line stretched from a hummock to the sledges.

Travelled eight miles.

March 16th, Tuesday.—During the night the wind got up and snow fell, and this morning it was still blowing a gale from north with thickly falling and driving snow, and a dense mist which cut off all view more than fifty yards from camp. We are obliged to remain here until it improves. This weather continued the same all day. The thermometers had risen to 10° below zero this morning. Extraordinary fluctuations! The wind dropped late in the evening, but snow continued to fall thickly.

The weather is anything but promising. We have been waiting for twelve months, looking forward to this journey, to the renewal of a life of more action than we have at the hut, and being again able to add more coast-lines, islands, and fjords to the map we have begun. The long period of comparative inaction, during which active exploration cannot be carried on, is very trying.

March 17th, Wednesday.—Overcast, misty, and fine snow falling. "Brownie" got loose during the night and ate a day's allowance of vegetables at a sitting by tearing open a bag on sledge, and this morning I found her crammed to repletion standing by a torn-open bag and utterly unable to get down

QUEEN VICTORIA SEA

ounce more. Her proportions were truly aldermanic. It will do her harm I fear.

Dug out the drifted-under sledges, straightened things up, and got under way through very deep snow, which rendered going bad for the animals and progress slow. I went ahead with the pony and her sledges to lead the way. Armitage followed with the dog-team.

On nearing Windward Island I took three negatives of it. I went on ski, and fixed a jack among the rocks on the southeast



"BROWNIE," OUR PONY

slope of the island. It is composed of weathered, broken-down basaltic cliffs rising about two hundred feet at the northeast end, and slopes gradually down towards Bruce Island. It runs southwest and northeast about a mile, and is about half a mile in breadth. It is bare of snow in summer and there is no ice-cap. A few rotches were to be seen about the rocks. Travelled about seven miles N.N.E. and then camped at 6 P.M.

March 18th, Thursday.—Started shortly after 10 A.M. in a dense mist, overcast sky, and snow falling heavily. This condition of weather lasted all day. Our course lay through broken-up ice among which the snow was very deep, and the pony, in spite of her boots, sank deeply and gave me much trouble to get her along at all. On several occasions near bergs we came upon water beneath the snow. We passed over a very low, small, stony island

A THOUSAND DAYS IN THE ARCTIC

off the coast of Bruce Island, half an hour after leaving camp which we had never seen before.

I fear the pony's surfeit on vegetables the night before last has deranged her bowels. She has symptoms which give me great uneasiness. Unfortunately, we have no aloes or any other horse medicine.

I steered north-by-east and stopped at 6.45 P.M., having travelled about ten miles.

March 19th, Friday.—The morning opened clear, but the horizon is still misty. I took bearings, of the Rubini Rock, which lies nearly true east of us.

There appears to be no definite cape, such as Peterhead is represented as being, but only curving lines of glaciated coast.

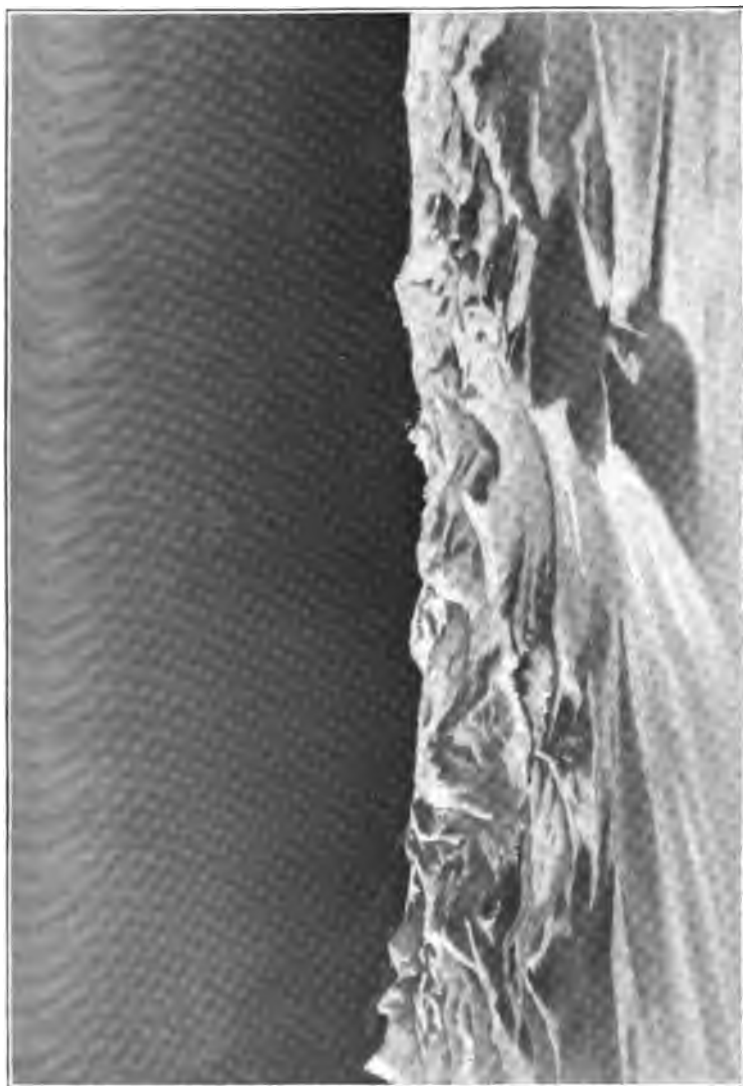
I took two or three bearings on turning out. The land at Peterhead is low and entirely ice-capped, with a glacier-face, curving round to the north and forming Clements' Markham Bay, the outlines of which I had mapped in in misty weather last spring and which I now find necessary somewhat to alter after a clearer view. Not a rock or speck of bare earth is visible, nothing but snow and ice as far as the eye can reach. Away to the westward the rolling glacier-slopes of Prince George's Land,* almost obscured by mist, blend with the gray sky; all is dim and silent, no sign of life is there, the Frost King reigns supreme, and it looks truly the land of the dead.

The weather cleared somewhat but remained more or less misty all day, and became very thick again after 2 P.M. Passed over fairly level floes but very deep in snow.

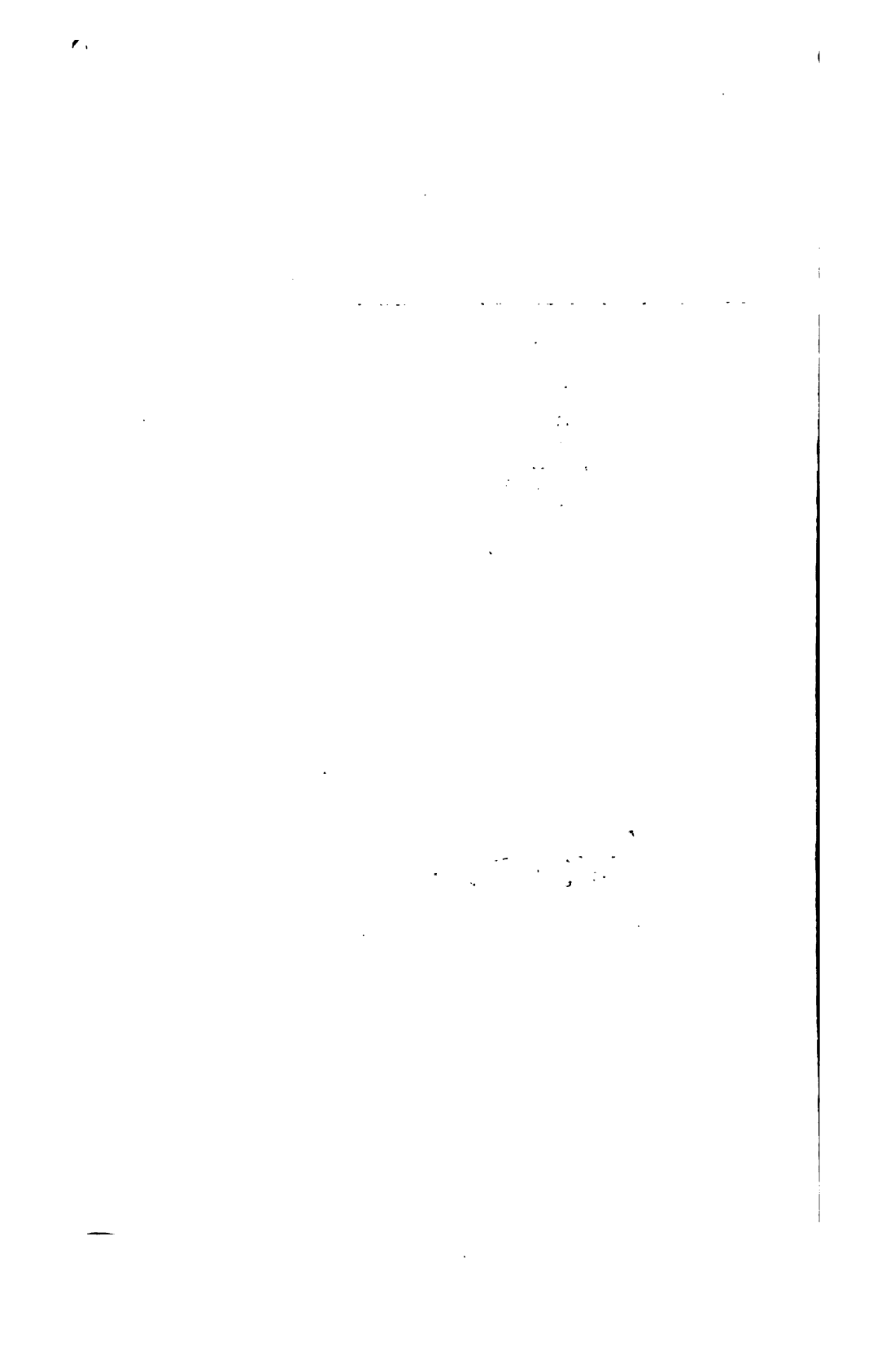
The pony is anything but well and is going badly. She evidently is seriously deranged as a result of her stolen gorge of dried vegetables. I have no medicine except a few pills. Came across more water under the snow to-day which "Brownie" floundered into and gave me some trouble to haul her sledges out of.

Peterhead does not come quite as far east as Mr. Leigh Smith has noted on his map, and the coast curves round towards the north instead of coming to an abrupt point at Peterhead. It was doubtless misty when he steamed up towards Eaton Island in the *Eira*.

* So named by me after H.R.H. Prince George of Wales.



"THE GOING IS EXCESSIVELY BAD, THROUGH BROKEN, CRUSHED-UP ICE, FULL OF PIT-FALLS"



QUEEN VICTORIA SEA

Proceeded north 10° east about ten miles.

March 20th, Saturday.—The pony is no better and is seriously ill, and will certainly die if I cannot relieve her. I collected mine and Armitage's pills to try and make up a dose for her, consisting of twelve blue-pills, four podophyllin, and six of Armitage's especial brand, making twenty-two in all; and these I placed in frozen fat from our frying-pan, and wrapped in paper and forced down her. I trust it may put her right, or she will say good-bye to us soon.

The same dreary, misty, snowy weather continues. We have only had one clear day (the first out) since leaving the hut, and it has snowed almost unceasingly ever since. The wind has been chiefly northeasterly, bringing up bank after bank of mist, rendering it often impossible to see anything even five yards off clearly, and picking a way through the hummocks and deep snow is very difficult. Continued our course, going about north-by-west towards the eastern point of the land. The going is excessively bad, being the greater part of the day through broken, crushed-up ice, full of pit-falls, and the snow is lying deep and soft, with only a slight crust upon it. It is one constant process of getting the pony and dogs out of holes and pulling up the sledges, taking sometimes half an hour to go a hundred yards. Over part of the course Armitage and I had to go thrice, taking one team at a time, and, by dint of shouting and hauling, got them along somehow. We and the animals were thoroughly tired out when we stopped at 6.45 P.M.

Course about north-by-west. Distance about six miles made good.

March 21st, Sunday.—Found the pony clean off her feed this morning, and looking very sick, poor beast.

As the horizon partly cleared, showing land at a great distance to the east of us, and the western land as far as a point about north-northeast of us, I made sketches and took a few bearings and photos of the camp. We then started towards the point to the north-northeast through the abominable ice and deep snow over which we have been travelling the last day or two. "Brownie" at once broke down. She lay on the snow groaning, and refused to budge an inch. Poor thing, she had a minute before strained her off fore-shoulder in one of the nasty trappy holes. I let her lie there to recover, and Armitage and

A THOUSAND DAYS IN THE ARCTIC

I took on the dog-team, and by constant whipping-up, shouting and dragging up the sledges, got them through the broken-up ice on to some somewhat smoother a mile ahead. We then left the dog-sledges and took the dogs back to where we had left the pony, and found her still on the ice. It is miserable work getting along a sick animal, but we must push on and cannot remain here.

We had some lunch, and then hitching up the dogs to two sledges and the pony to one, we got them as far as the advanced sledges, where, the going being better and "Brownie" somewhat recovered, we harnessed up again on our original method, but changed the order of the sledges. The going now improved and we got ahead about two and a half miles when the darkness called a halt. Armitage then found that he had left his sheath-knife on the snow where we had hitched up again. I went back for it a distance of two and a half miles while he straightened up the camp. It came on very misty again after 4 P.M. and the sky became overcast. The thermometer stood at 23° below zero when we camped.

We travelled north-northeast about four miles. We uncoupled "Worm," as he was doing no work and was only in the way, and he appears to have disappeared and returned to Camp Flora. He was following behind me for some distance, but was too much engaged to notice that he had departed.

March 22d, Monday.—Overcast, misty, and snowing. The filthy weather does stick to us!

Started to round the point to the northward of us. The pony, which is very sick and lame too, although the pills have done her good, soon gave up, lay down, and refused to budge an inch. I find it very hard work trying to get her along. As I could not move her, I let her lie quiet, and Armitage and I took on the dog-team and then returned with the dogs and brought on the pony's sledges. The snow is terribly deep, with ugly traps among the broken-up ice, and the dogs go along laboriously and with many stoppages and frequent upsets. We stopped at 8 P.M., after a heavy day's work and disappointingly little progress.

Our horizon has been misty, and is every day bounded by a dim circle of fifty yards, except the first one out. There has been an incessant fall of snow, and very deep drifts and broken-up ice to clamber over. Took a meridian altitude for latitude. We covered about three miles in a northerly direction.

QUEEN VICTORIA SEA

March 23d, Tuesday.— On turning out the temperature had fallen to 27° below zero, with a light southwest breeze and a clear sky for a change, and without much mist. The land showed up on the eastern side of the British Channel, but with the exception of Capes Richthofen, Sybil, and Fisher, I could not identify points owing to the distance. I took a telescopic negative of Cape Richthofen, which then bore $46\frac{1}{2}^{\circ}$ (magnetic) from us.

"Brownie," poor beast, goes very indifferently and lay down several times, and only by incessant urging can I get her along



" 'BROWNIE,' POOR BEAST, LAY DOWN SEVERAL TIMES "

at all. It is miserable work driving a sick animal, although she is better than she was, but we cannot remain here. The dogs went, if anything, still worse, and Armitage was continually far behind, necessitating my leaving the pony to help him.

After lunch we got on to harder and somewhat less sticky snow, and "Brownie" went better, but not so the dogs. "Charlie" and "Hyena" both refused to eat anything on reaching camp in the evening. We have a wretched lot of animals.

I followed a north-northeast course (magnetic) along the glacier edge, and we covered about seven miles. The land is entirely

A THOUSAND DAYS IN THE ARCTIC

glaciated, and rises to a height of about seven hundred feet : the sky-line as far as we can see. The greatest height of land we have found in Franz-Josef Land is about 2000 feet. Not a stone or bit of earth is to be seen, but only one ice-covered surface. The thermometer stood at 33° below zero when we camped, and fell to 36° below later on in the evening. The land on the eastern side of the British Channel is higher than on this side, and Hooker Island is about 2000 feet at the dividing ridge, the highest point, from which the ice flows in different directions.

At lunch-time Cape Fisher bore $31\frac{1}{2}^{\circ}$ and Cape Richthofen $45\frac{1}{2}^{\circ}$ (both magnetic), while Brown Fjord,* running up between them, could be plainly seen. At the head was distant and doubtless Cape Farman.†

Armitage took a meridian altitude for latitude.

March 24th, Wednesday.—Blowing a strong breeze from the north when we turned out at 6 A.M., which rapidly increased to a fresh gale from northwest, with a blinding, suffocating snow-drift. Nothing to do but to wait in patience till it is better. This state of the weather continued all day until 5 P.M., when it suddenly ceased, and then it blew in gusts from all round the compass. At 7 P.M. the wind got back into the northwest again, increased in force, and the sky became overcast and misty. We sat in our cramped quarters inside the tent, doing any odd jobs that might be necessary, and endeavoring to keep ourselves warm, only going outside to feed the animals or to perform any duty that might be necessary. So we spent the day.

Armitage and I, on the wind dropping, dug the sledges out of the drifts, in which they were completely buried, and straightened things up a little.

March 25th, Thursday.—A great improvement in the weather, and the gale has hardened the snow beautifully. Our spirits rise as our prospects seem better, for we have had a most unpleasant ten days. We got under way, and directed our course round the point to the north, which rounds off and turns westerly. Very high undulating glacier-face lines the entire coast, being as high as 80 feet in places ; sometimes in front of a high

*So named by me after Captain Brown, skipper of the *Windward* in 1896 and 1897.

†Named after Mr. Edgar Farman by me.

QUEEN VICTORIA SEA

re-dome (submerged bluff) it sinks to as low as 10 or 12 feet, and then again rises to as high as 80 feet. About five miles round the point a plateau, strewn with jagged basaltic boulders of a height of 300 feet, which I have named Cape John Murray after Dr., now Sir, John Murray, presents the only exposed land we have seen along this coast. This headland has glacier in front of it, by which I ascended to the plateau in the fierce gale and driving snow, and made what examinations I could under the circumstances. The ice is here much broken up, cracks with water in



DOG-TEAM UNDER WAY WITH SAIL

them being frequent, and a tide-crack (four feet wide) running along the glacier face appears to have more movement in it than those farther south. Perhaps we get the polar basin tide here. The southwest wind (force 4 to 6), which we utilized for our sails, helped us along in fine style, but rapidly increased, and at 5 p.m. had become a fresh gale, with dense driving snow. We pushed on for two hours longer, but the snow and mist had become so thick that we could hardly see the ice-precipices of the glacier-face sixty yards away; I could barely distinguish Armitage a dozen yards behind, occasionally losing sight of him entirely, and had to stop. I should have lost him. The drift became so dense on rounding

A THOUSAND DAYS IN THE ARCTIC

the turn of the glacier, where we found ourselves somewhat out of the wind but in a perfect whirl of blinding, suffocating, snowy particles—in fact, in a backwater of the storm—as to cut off all view more than three yards distant. It was with great difficulty by groping about in this semi-darkness, I found a small hummock close to the glacier-face, eighty feet above us, and there stopped, as further progress was impossible. Under considerable difficulties we at last got the tent up. The tide-crack opened in an unpleasant manner, suggesting the possibility of the floe going off and taking us off to sea upon it. Having got our things into the tent, the dogs and pony fed, we proceeded to make ourselves as comfortable as circumstances would allow. Our socks and the grass in our boots, made wet with condensed perspiration, were changed for others, and the moist socks and mitts placed upon our chests to dry, which is the only means possible, as of course we can never have a fire when sledging; then having put on our furs and cooked our dinner of frozen loom-meat over a spirit-lamp, we lay down to sleep. We had hardly done so when an ominous roar close at hand, followed by two more, roused us up, and we craned our necks out of the tent to endeavor to ascertain the cause. Is the glacier discharging bergs close at hand? It sounds like it. If so, our position close to it, to say the least, is not a pleasant one. However, we could see nothing through the blinding snow, so we lay down again and decided to chance it. Once or twice this noise like thunder is repeated. On the occurrence of these sounds we felt very uneasy, and were in momentary expectation that a mass of ice, weighing hundreds of tons, would crash down upon us. However, it could not be helped, as we could not see to move our camp, and in such weather we felt we might easily step out of the frying-pan into the fire.

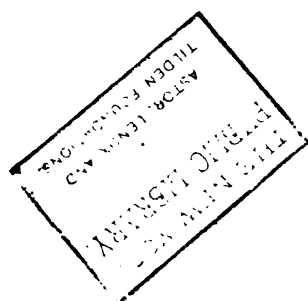
It is a climate! The gale continued all night with a blinding drift, filling everything with snow, and our camp was one of unmitigated discomfort. Possibly the southwest gale—almost unknown at Cape Flora—is caused by the wind blowing up the glaciated country to the open water to the north.

Many bear-tracks and bird-dirt indicate open water being near.

March 26th, Friday.—This morning we found that several avalanches of snow had slipped off the glacier above us on to the floe beneath, twenty-five yards from our tent; and that the



ON THE MARCH



QUEEN VICTORIA SEA

weight of the snow had so borne down the ice as to force the water up. I found "Brownie" standing up to her knees in it, and water permeating through the snow upon which we are lying, soaking our belongings.

The gale is still blowing and the snow driving as hard as ever, with a temperature of from 15° to 20° below zero.

There was nothing for it but to pack up with all speed before matters became worse, and we were quite submerged; so, in spite of the utterly vile weather, we had to move on, as a further snow-slip from the glacier might place us in the sea itself, and our quarters were not the acme of comfort as it was. The sledges were buried three feet down under hard snow, with only one or two of the top packages showing, and the tent we were in was half buried, although we had been here only a few hours. Under considerable difficulty, and after three hours' digging, we got things upon the sledges and started in a strong gale from the southwest, with dense driving snow. We struck out from the glacier-face, and after going about a mile, found a spot protected somewhat from the wind by a pile of broken-up ice, where we again camped until the gale moderated. Armitage and I both got our noses and cheeks frozen in the process, and I both my wrists, upon which appeared large blisters in the course of a few hours, which later became troublesome sores as large as half-crown pieces.

This looks a fearfully wind-stricken spot; all the ice away from the glacier being cut clean of all snow, and in places the ice is quite polished by the wind.

March 27th, Saturday.—The morning opened overcast, but clear to the eastward, and I took a number of bearings of recognizable points (Capes Fisher, Sybil, Alice Armitage, Richthofen, Polar Gleams, southern curve of Koettlitz Island, and Cape Albert Markham), and was thus able to fix our position here. The sky cleared later, and a really beautiful day opened up, which is a treat, indeed. I took a number of negatives of the coast-line before leaving camp, and then proceeded along the coast at about a mile distant from it towards the northeastern point of the land. Arthur Island* to the north, which appears to be entirely glaciated, now shows up. A few rocky cliffs of

* Named by me after my brother, Arthur Jackson.

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columnar basalt crop out of the ice near the shores of Prince George's Land.

After having lunch, what had appeared to be a bay now, on opening up, suggests a fjord breaking up the land into islands. To endeavor to clear this matter up I set Armitage at 6 P.M. to make the camp, while I started off on ski to ascend a rocky headland, about four hundred feet high, of weathered columnar basalt, at the southern entrance to the bay or fjord about two miles off, which I named St. Chad's Head, after my old school, Deane College. On reaching this I could see the bay or fjord about five miles wide and about twelve miles long, and lined with basaltic cliffs with high country surrounding it. This fjord named, after the Right Honorable Joseph Chamberlain, Mr. Chamberlain Fjord. I could not ascertain for certain if it ran out to the sea beyond, but it appears to do so in a W.S.W. direction, turning again northwest. Only a few lichens and mosses represent the vegetation on the headland, so far as I could ascertain, at this season of the year. It has a talus of basaltic debris around which a few roaches were flying. I could find no driftwood upon St. Chad's Head, although I searched carefully for it. I noticed again to-day recent bear-tracks following the tide-cracks. Doubtless seals frequently winter in these cracks instead of going south, otherwise bears would not make them their hunting ground. I could see no open water, but only a dark sky to the north indicative of it. There is no open water as far south as last year, and Cape McClintock has ice running between it and Arthur Island to the north of us. All this portion of the British Channel, as far south on the western side as Cape John Murray, was open sea, and almost devoid of ice last spring; now it is frozen over with light unstable ice, with open cracks running through it as far as the eye can reach.

The cape at the northern entrance to Chamberlain Fjord I named Cape Grosvenor, after the London club that has shown me so much hospitality and kindness.

Travelled N. 27 W. about six miles.

March 28th, Sunday.—Another fine, clear day. After taking a few negatives we set out towards the northeast point of the land. We had to deviate towards the shore somewhat to avoid very rough ice, going northwest by north about five miles, stopping for food, with Cape Grosvenor exactly west of us. The scene is

QUEEN VICTORIA SEA

extremely desolate. To the north the shield-like outlines of Arthur Island blend its icy slopes with the gray sky beyond. To the north-northeast nothing can be seen but an interminable expanse of ice. The bold white outlines of Albert Armitage Island* are only broken here and there by darker basaltic rocks appearing through the ice-cap at intervals at the northern and southern extremes of the land. On the eastern side of the British Channel



THE BRITISH CHANNEL AND ALBERT ARMITAGE ISLAND

Capes McClintock, Fisher, and Richthofen are dimly visible. Capes Polar Gleams and Albert Markham have now sunk below the southeasterly horizon.

The pony, which has been better since her dose, now shows signs of being deranged again. "Hyena" is going very badly and is of little use. The bad weather has tried the animals very much.

After lunch we crossed several wide-open cracks with water in them, and we had to take the pony out of the sledges and drag her over and push the sledges over afterwards. This delayed us very much, and we did not round the headland until 7 P.M. I stopped several times to take bearings and negatives. Capes Fisher and Richthofen, being fixed by astronomical observa-

* Named by me after my comrade, Mr. Albert B. Armitage.

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tions, are very useful in determining positions along this coast by cross-bearings. There has been very great pressure in Leif Smith Sound—named so by me after the gentleman whose bold and successful voyages and excellent geographical work paved the way for my own expedition—and the ice in the neighborhood of Cape Bruce is in a very rough and tumbled condition. There is, however, little snow upon it, all having been blown off, and suggests that along this coast almost constant gales are blowing which evidently, by the direction of the sastrugi of the snow, principally from southwest. On rounding the cape the land trends southwest in a wide curve, with a headland about eight feet high and apparently ice free lying about six miles off. To this headland I named Cape Battenberg, after Prince Henry of Battenberg, who sacrificed his life in serving Great Britain, his adopted country. After helping Armitage to form the camp I walked to the rocks, half a mile off, and climbed the stony talus of the basaltic cliffs, which are about five hundred feet high, and took bearings and sketches of all visible land. I could see no signs of land to the north not previously mapped by me. The cape is very barren, and only a few lichens (red, black, and gray) and a lichenaria, which I got in the tide-crack, were found to represent vegetation. Rotches were flying near the cape. I also noticed the signs of foxes and saw a few dovekies.

March 29th, Monday.—Misty, snowing, overcast, and blowing a gale from southwest. Shall have to camp till it clears a bit. These endless bad-weather camps are very trying to men and animals, and we are heartily sick of them. The weariness, delay and inaction, combined with the acme of discomfort, is not exhilarating by any means. We sit in the tent trying to keep warm, and speculating upon where and how far the land to the westward goes, and what distance we shall have to travel to go round it. We endeavor to do small jobs, such as repairing the dog traces, which, being coated with ice and frozen as hard as steel bands, is cool and tiresome work, and we have constantly to thrust our numbed hands into our pockets to restore the circulation to them and to thaw out the finger-tips. The bitter blizzard still continues, and the only sounds heard are the roar of the wind and the howls and whines of the poor dogs which now and then rise above the turmoil of the tempest. The pony stands in her blanket coat, with her back humped up and turned

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towards the wind; the dogs have curled themselves up with their noses under their tails, and are buried beneath the drift. So the time slowly passes. I wrote the following record, after thawing out the little bottle of ink which Armitage held in his hand to keep fluid while I wrote, to leave, with three visiting cards and a penny-piece wrapped in a jack and placed inside a corked spirit-tin, in a small cairn on the top of the cape, if I am able to get up there when the weather is better :

" THE JACKSON-HARMSWORTH POLAR EXPEDITION.

"Two members of the above expedition reached this spot on March 28, 1897, two weeks out from Cape Flora, having been much delayed by bad weather. We make the position of this cape to be lat. $80^{\circ} 56' N.$, long. $50^{\circ} 47' E.$

"We intend to proceed in a W.S.W. direction round the land. All well.

(Signed)

" A. B. ARMITAGE.

" FREDERICK G. JACKSON,

" Commanding the Expedition."

The bad weather continued through the day until evening, when it began to clear up. I had examined the dogs when I turned out this morning, and found them buried in the drift, but apparently all right. The gale blew hard, and the snow drove fiercely before it, which, with the very low temperature, cut the small exposed portion of one's face around the eyes like a knife, and fairly blew through us. This afternoon I found poor "Pincher," one of the dogs, frozen as hard as a piece of rock and quite dead. He was fairly frozen to death. "Rags" had one leg frozen down into the ice, which we had to hack out with a small pick to release. Four dogs are off their feed.

We took the pony's snow-boots off in the evening, as there is very little snow on the ice here. Her hind boots, from moisture, were hard frozen and had ice in them, and we had considerable difficulty in getting them off. The front ones were all right.

March 30th, Tuesday.—An improvement in the weather this morning. Having had breakfast, I started off with my hand-camera, compass and stand, the tin, flag, and crow-bar, to make a cairn and take bearings on the top of the cape, leaving Armitage to break up camp and pack up. I ascended the rocks by the ice-slope on the western side and made a cairn on the northwest side of the summit. I flew four flags and photographed them

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flying from the cairn. Left one of our small jacks upon a seven foot bamboo staff standing above the cairn, among the stones of which I deposited the tin containing the record, etc. Took a few bearings and made sketches of the coast-line within view. It was clear to the northwest (but misty otherwise), and I could see a polynia of water about ten miles away. None of the ice heavy, but small, broken, crushed-up stuff and no bergs. A few broken-up pieces of fresh-water ice and fjord ice without any heavy ice suggest to my mind the possibility of land to the northwest,* although no sign of it is visible. There is a connected land floe for at least six miles to seaward. The land to the southwest appears very low, and the coast of the curved bay named by me Crichton Somerville Bay,† running to the S.S.W. from the cape, is quite low and free of ice, as is also a peninsula forming the northwest coast of it. I estimate the height of the cape at five hundred feet. It consists of weathered columnar basalt. A few dovekies were on the rocks and a considerable number of roaches. The summit consists of broken-up basalt overgrown in places by moss, so far as I could ascertain by digging. Lichens were on the rocks, and I found one saxifrage on the talus. I got my cheek a good deal frozen on the top, as a keen northeast wind, with a temperature of 20° below zero, was blowing there, and on my return to camp it was found to be quite white.

When I got back we had some food and made a start. Poor little "Joey" died soon after leaving. He had gradually grown weaker and weaker, and now could hardly totter along. We carried him on a sledge for some hours, as he walked badly wrapped up as warmly as we could, but it was of no avail. He died on the sledge, and was frozen hard before we camped a night. Poor little chap! he was plucky and game to the end, but the cold and exposure were too much for him. This incessant bad weather is killing our animals, and all look weak and off color. The pony has got very thin and goes badly, requiring incessant urging to keep up a slow walk. The northeast wind increased in force as the day went on, and when we encamped inside the northwest extreme of Crichton Somerville Bay it was

* I think it probable the islands to the north and north-northwest hold a good land floe here.

† After Mr. D. M. M. Crichton Somerville.

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blowing a strong wind, with a temperature of 22° below zero, making it very cool and trying, freezing our noses and cheeks every few minutes, as our face-guards have got coated with ice and are frozen hard.

The low shores of the bay consist of basalt, and on the north-western side rise to about seventy-five feet, with a flat surface after an abrupt rise from the sea. The wind increased to a gale as we pitched the tent for the night. There seems no end to this horrible weather or the inconveniences accompanying it. When sledging, all food is frozen hard. The fried loom-meat, which we cut into small pieces ready for warming up when at the hut, now resembles marbles; butter is like stone and tests the strongest knife to make an impression upon it. Our furs are as stiff and hard as sheets of galvanized iron, and Armitage and I have sat for hours after a hard day's march, shivering in the tent, trying to force our bodies into them by degrees by sitting upon first one part of a "militza" and then another, and gradually working it with our hands into a more pliable condition. Such are some of the joys of sledging.

March 31st, Wednesday.—Blowing a gale from northeast, with dense driving snow, snow falling, and it is bitterly cold. The temperature has fallen to 36° below zero during the night. All that can be done is to remain camped and try to keep ourselves warm. The tent, of course, is incessantly raining showers of snow, from condensation, down upon us; and our furs and all our gear, from being very wet, are frozen as stiff as steel, and are white with frost. It is a labor of hours to get into any of our fur clothes. A worse climate than this it is impossible to imagine. We are obliged to sit here in the utmost discomfort, eating our food and doing nothing for it: time is creeping on, and our animals are freezing outside in the blizzard.

This evening four of the dogs refused their food. All the animals will die if this kind of weather continues.

April 1st, Thursday.—The thermometer fell to 45° below zero during the night, but the wind has decreased in force and is now westerly, with overcast sky, dense mist, a fine snow falling, and the temperature is rising.

As it looks as if we had got into a *cul-de-sac* in this bay, I think it better to go round the low basaltic headland, Cape Battenberg, which is eighty feet high, and outside it, rather than sledge over

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the low land with our weak animals, which may lead us into endless difficulties.

We packed up and started, meeting a keen, damp westerly wind, which, with a temperature of 22° below zero, is cool. We stopped at 2.30 P.M. for some food, and as the wind had increased from fresh to strong, with driving snow, we put up the tent for an hour—but, to save time, without throwing up snow around it—to get some protection. Our faces raw, from frost-bites and excessively sensitive, obliged us to constantly wear our masks; our hands, too, are in much the same condition.

We were very cold, as the biting wind fairly blew through us, and we should have become badly frost-bitten had we had food in the open. We look awful ruffians, with our scrubby beards and frost-scarred faces. My wrists, too, are raw from the frozen cuffs of my jumper chafing them. They had only just healed from old frost-bites, and I think our appearance would astonish our acquaintances could they see us. We often roar with laughter at each other, and wonder what some of our West End friends would think of us could they meet us in our present condition. Certainly we should create some amusement were we to appear in Piccadilly or the Park now.

After lunch we passed through very rough broken-up ice, with a number of small bergs among it, which give us much trouble. "Hyena" completely gave in, and could not walk behind the sledge. As there was no chance of his recovering I put him out of his misery, poor beast. Three others will follow him unless they improve soon. The prospect isn't cheerful, and we shall be reduced soon at this rate to hauling as best we can the sledges ourselves, which will mean leaving both the canoes and most of our equipment behind. We proceeded as best we could through the rough ice and dense mist in a W.S.W. direction to clear any outlying points of land, for we could see nothing ahead of us, and about 5 P.M. got on to sticky bay ice and sighted open water. To avoid this I struck southwest and got upon older ice and deep, hollow snow, with only a surface crust upon it. I had great trouble to get "Brownie" along at all, as she is weak and utterly played out, and the dogs are no better. It is miserable work to get along with weak, tottering animals; but there is no help for it, for push on we must. When I stopped at 8 P.M. the pony threw herself down and refused to move until lifted on to her legs. The

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thermometer then stood at 30° below zero, with a fresh wind blowing. It took us hours to get into our furs in the evening, which, having got wet a week or two ago, are frozen as hard as rock. It is very trying weather for our poor animals; the wind goes through everything. We frequently speculate as to how far we have to go yet and how long they will last out.

Travelled in all about eight miles.

April 2d, Friday. — I took bearings to fix our position as soon as I turned out, as the mist has somewhat lifted. The thermometer registered 42° below zero during the night, and stands at 30° below now, with the sun well up. Proceeded in a southwestern direction towards a distant point of land. Very misty towards the eastward, and cannot make out quite the contour of the coast there, chiefly owing to there being low land on this side of the higher country.

We have passed over ice varying in character greatly, some consisting of crushed-up, heavy, oceanic ice deep with snow, and then coming upon thin crushed-up bay floes, with little snow upon them. A keen wind with the low temperature obliges us constantly to use our face-masks. We stopped for lunch at 6 P.M., putting up the tent in a hasty, temporary manner, and then continued our march until 9.40 P.M., when I could no longer see the point of land, owing to mist and increasing darkness. The temperature then was 32° below zero, with a nasty wind. We are getting a little tired of these low temperatures with a high wind. It isn't a bit nice.

The animals went better to-day, and by breaking up the meat small with a tomahawk, we induced "Smike," "Charlie," and "Rags," the dogs which are in the worst condition, to eat a little.

Travelled southwest about seven miles. Our furs are in a fearful state of hardness, and took us till 2 A.M. to thaw them sufficiently to get into them to-night.

We never walk in our furs, as one gets too warm in them, and the impervious skin shuts in the perspiration. The dress we have now adopted for marching I consider is difficult to improve upon. It consists of knee-breeches of warm cloth, a loose jumper of thick woollen stuff, and a close-fitting cap, wrapping close round the neck, ears, throat, and chin, and coming well round the face, across which is buttoned what is practically a cloth mask, leaving only apertures for the mouth and eyes. The whole dress is cov-

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ered with a thin, light water-proof linen material, which stops wind and prevents snow from sticking. It is the outcome of years of practical experience, and I have altered, modified, added to the dress until I have obtained what is, I believe, as perfect as any dress can be in the Arctic, which is an exceedingly difficult part of the world to dress for—where too warm dress is as bad as one not warm enough. Once get hot perspiring and it takes hours before one feels dry again, and the invariable accompaniment of feeling cold and getting chills.

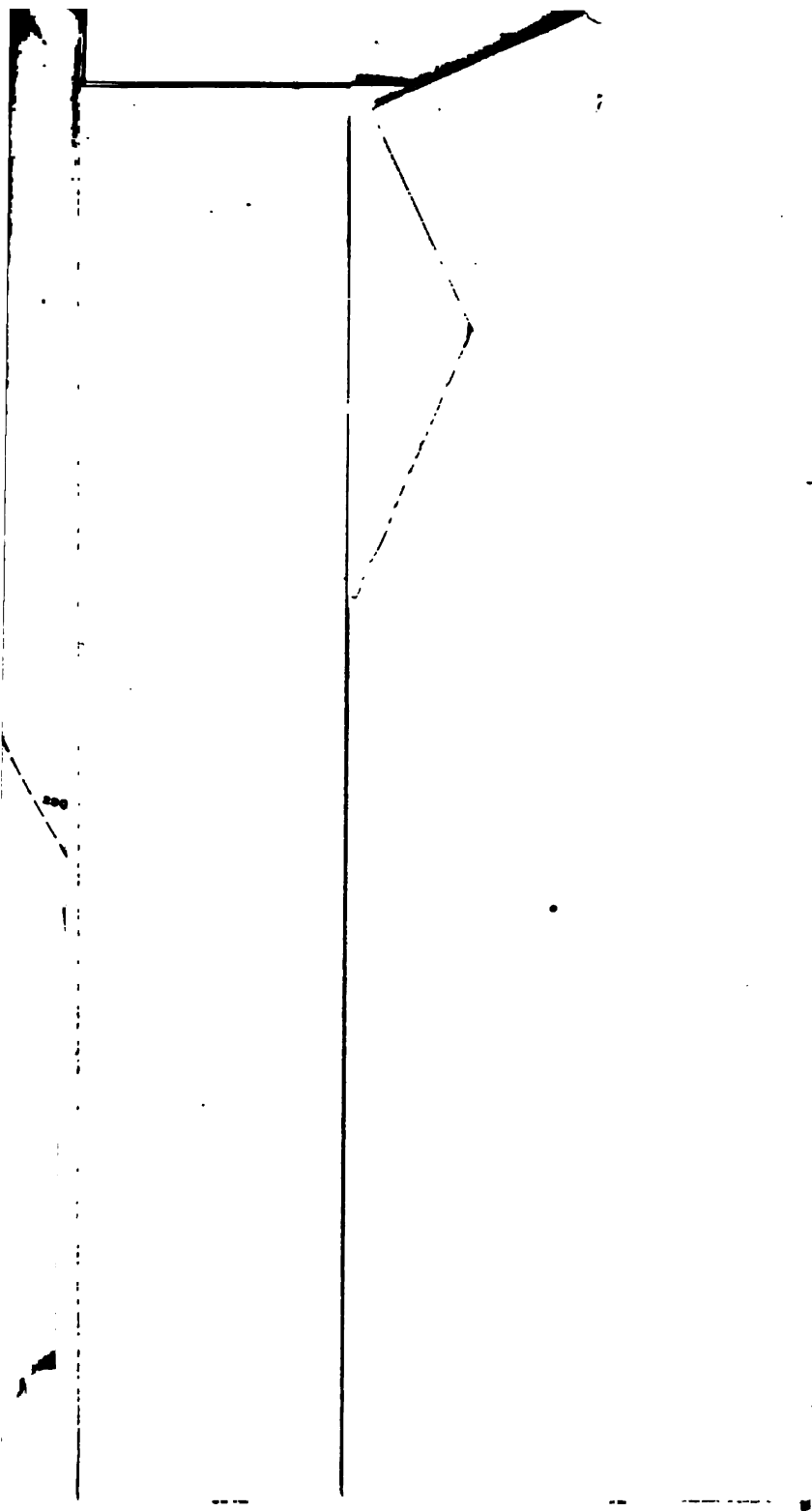
April 3d, Saturday.—The thermometer had sunk to 46° below zero, but when we turned out it had risen some degrees, with W.S.W. wind, mist, and falling snow, but the temperature fell again. We packed up and started southwest towards a point across the large fjord—Mabel Bruce Fjord—which I believe connects with Chamberlain Fjord, and also curves round to the westward, over much broken-up but light ice with little snow upon it. As we pushed on the wind increased in force, and was very trying, as we had to march straight in the teeth of it. The driving snow was blinding, and cut our eyes like shot.

We had much difficulty in putting up the tent temporarily for lunch, and after having had a pot of tea, some biscuit, chocolate, and bacon, we struggled on, hauling at the sledges and shouting at the animals, which stopped every few yards. The wind increased to a strong wind, which rapidly became a fresh gale. We had lost sight of the land before lunch, and I directed the course by the wind, the dense driving snow rendering it difficult even to see Armitage, who was following with the dog-team. Once I lost sight of him, as he had fallen behind, so I went back on my tracks as far as I dare go without losing sight of the pack and sledges, and coo-o-o-ed and shouted, and there waited for him to come up, which he did after some time. The animals were badly, and it was with difficulty that they could be forced to face the wind and drift.

We struggled on until 11 P.M., when we absolutely could not see ten yards in any direction. The tent took us hours to get up in the blizzard, and was finally erected in a very lop-sided condition, but it was the best we could do; we were glad to get anything in the way of shelter. It is a charming climate!

Travelled southwest about six miles.

April 4th, Sunday.—The gale dropped during the morning,



THE NORTHWEST

wind changed to W.N.W., and the sky cleared. Armitage took a meridian altitude, making the latitude $80^{\circ} 48' 46''$ N. (approximately). On the mist on the horizon lifting, I took a round of angles and a few photographic negatives, and then started off in a W.S.W. direction towards the termination of the ice-slope ahead. As we advanced low land in front of it opened up, and I gradually altered my course to get round it to nearly W.N.W. The characteristics of this northern coast are quite different from anything we have seen elsewhere in Franz-Josef Land. Here the land is low, and the high basaltic headlands, so common elsewhere, are conspicuous by their absence.

Before stopping for lunch "Mick" entirely broke down, and we carried him upon a sledge, but before reaching our lunch camp the poor animal died. As we are running very short of meat, we cut him up and fed the other dogs with him, all of which, "Räwing" excepted, ate all they could get. We then pushed on across fairly level floes with little snow upon them till 11 P.M., when we reached the end of the long stony spit, where we camped. At 5 P.M. we stopped for a few minutes to take an observation for longitude. The dogs went very badly, owing to their weak condition, and are now reduced to eight in number. The pony stepped out better. Her bowels are now getting into a more healthy condition.

There was a dense wet mist after 7 P.M., completely hiding the land. The thermometer was 12° below zero when we stopped. Wind (moderate) from west.

April 5th, Monday.—At 2 P.M. Armitage and I took observations for double altitude, and I then took two sextant observations to mean with Armitage's, while he took the time for me.

I placed the following record in a tin, together with three visiting-cards, a penny-piece, and a jack, and buried it in a cairn of stones upon the spot :

"THE JACKSON-HARMSWORTH POLAR EXPEDITION.

"Two members of the above expedition reached this spot April 4, 1897, having travelled up the British Channel and round the northeast point of the land.

"We have experienced very severe weather, and this has reduced our number of dogs from twelve to eight, which are very weak.

(Signed)

"A. B. ARMITAGE.

"FREDERICK G. JACKSON,

"Commanding the Expedition."

"April 5, 1897."

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I feel very sure from the character of the ice off here that the set of it is off-shore, and that strong northerly winds are not the rule, or else there is land to the northwest, which protects the ice here. We can, however, see none.

Several flocks of roches were noticed yesterday and to-day and three looms flying west; they were, however, very distant. I took bearings of all land visible and made sketches. I also took several photographic views of the cairn and camp. The cairn made of large jagged basaltic boulders upon a slight rise of the low stony spit, and should always be a prominent and easily seen object. It is about three feet six inches high. At 5 P.M. we took the second observation for double altitude and sun's bearing for declination.

We then packed up and started, but it had quickly become overcast, with a dense mist from southeast and wind, which rapidly increased to a fresh gale with heavy snow.

We pushed on with great difficulty and without being able to see anything clearly beyond the points of our ski. Armitage and his dog-team, twenty yards behind me, were frequently almost hidden from sight, and occasionally completely. The dogs went very badly, occasioning constant stoppages and hauling up of the sledges. I went on steering by the wind until 10 P.M., when coming across a boulder of basalt, rounded off as if by water, I decided to camp, as we were doing little good, owing to the difficulty of keeping a course, and were wearing the animals out. They would not face W.S.W. at all, the direction of our course, as the wind met them sideway, and they would turn their backs upon it in spite of all we might do to prevent them. I therefore kept more westerly.

We put the tent up in the howling gale and snow with great difficulty, going through quite a chapter of accidents in doing so and feeling very much out of temper at things in general. This is a climate, indeed!

The dearth of draught animals has contributed greatly to our difficulties on this journey. We shall be lucky to get back with any of our animals alive, and without leaving behind a great part of our equipment.

The temperature rose to $+5^{\circ}$ during the southeast gale, but the wind changing to west during the night, it fell again to 13° below zero.

THE NORTHWEST

This low land on the northwest coast is remarkable, and renders it rather difficult to pick a way. I have seen no glaciers that reach the sea since leaving the British Channel.

April 6th, Tuesday.—Poor "Charlie" this afternoon ended his days, and I had to convert him into dog-meat. Last night's storm practically finished him. Seeing our animals die in this manner is sad work. The thermometer had fallen again to 19° below zero when we turned out.

We started over the low flat country in a W.S.W. direction. It is nearly level, but with slight eminences of broken-up basalt here and there, caused I believe by ice. The dogs went badly, owing to reduced numbers, and "Misere" and "Pongo" broke down. On stopping at 9.20 P.M. I gave them both a little whiskey, wrapped them up in empty vegetable bags, as the thermometer stood at 30° below zero, and they at once dropped off to sleep.

What looks like the head of a bay shows up a little to the east of south of us, but it is too misty in that direction to get a clear view, or be sure of anything.

We travelled W.S.W. about six miles. I had an accident with my watch to-day, letting it fall, owing to hard frozen icy mitts, and it has stopped. Armitage lost a compass off the sledge. Misfortunes never come singly!

April 7th, Wednesday.—The day opened sunny and clear. To my great surprise the bay to the south by east of us leads out to the southward. It must be Cambridge Bay, which reaches much farther north than we supposed in July, 1895, and does not run out in the manner I then supposed. I took a photo of the head of the bay and camp.

"Pongo" and "Misere" died early this morning. I am particularly sorry about poor little "Pongo"; he was one of my own dogs, was always plucky, and always willing. He hauled gamely right up to the finish. He was one of "Jennie's" pups, and was a favorite of mine owing to his resemblance to her. We have now only five dogs left. I skinned and cut up the dead ones for dog food, for we cannot afford to waste meat. We took observations for double altitude.

I then went off on ski, taking my hand-camera to satisfy all possible doubts as to the ice which lay before me being salt, and not that of a lake, by examining the tide-cracks. After going a

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couple of miles I came upon the shore of the bay with numerous tide-cracks, and also bergs lying off the northeastern shore at the foot of the ice-slope. I took several negatives of the glacier-slope and head of the bay. Armitage had in the meantime been engaged in packing up. I hurried up my return to camp, as it was rapidly becoming overcast and misty, and heavy clouds were coming up fast from the southeast. I wished the second observa-



A CAMP ON THE SHORES OF THE QUEEN VICTORIA SEA

tion for double altitude to be taken before the weather rendered it out of the question. We did this immediately I got back to camp.

The bearing of the direction of the bay from our camp on the northwest side of it (distant two miles from the shore) was 158° (magnetic), and I could see nothing but sea ice at the southern end. On either side moderately high glacier-slopes bounded its shores, which appeared to rise to from about five to nine hundred feet high.

After having some lunch of tea, biscuit, bacon, and cheese, we

THE NORTHWEST

started off in a W.S.W. direction. A thick mist had come up with a southeast wind, with a temperature of 25° below zero, and the weather looked very threatening.

The dogs pulled well but slowly, as the poor brutes are greatly overweighted now, owing to our losses. I relieved them of as much extra weight as possible, adding some of their load to the pony's. They and "Brownie" look wretchedly thin and weak. They are, however, struggling pluckily along.

We passed over a low, undulating country of broken-up basalt, with slight rises here and there, but deeply covered with snow. It reminds me occasionally very much of the tundra of Waigatz and northeast Russia.

We went on until 9.55 P.M., when, as I then came upon a suitable bowlder to tie the pony up to, and the weather was rapidly getting worse, so that we could see absolutely nothing around us but a dim, very circumscribed, misty white circle, I decided to camp. The wind had increased to a gale from southeast, with falling and driving snow, and the thermometer had risen to zero.

We travelled W.S.W. about six miles. None but those who have experienced it know what excessive labor and trial of temper it costs to cover every single mile in this country under our circumstances. There is every indication on the sky of open water to the W.S.W. and W.

I am inclined to believe that Cambridge Bay runs out at the northeast corner.

April 8th, Thursday.—Blew hard all night, but lulled somewhat in the morning, and we hoped it was over. I started to take a meridian altitude of the sun for latitude, but it rapidly clouded over again, and the wind increased to a strong gale, which shook our tent violently and threatened to carry it bodily away. The temperature at 10 A.M. had risen to $+24^{\circ}$ (a rise of 60° in twenty-four hours). We shall have to wait until the weather improves, and another bad-weather camp is our lot. We mended mitts and made necessary repairs to our equipment. Armitage worked out yesterday's observation for double altitude, which places us to the north of Cambridge Bay. The gale continued, with snow, throughout the day, but the mist cleared a trifle about 8 P.M., and the wind fell. The thermometer stood at from $+14^{\circ}$ to 21° throughout the day, and everything in the tent is now moist and wet. Our furs are beginning to smell and

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go rotten. These great fluctuations of temperature are very troublesome. By-and-by the thermometer will fall again, and the frozen hardness of our garments will be worse than ever.

April 9th, Friday.—Overcast, misty, and still warm (temperature through night, minimum 9° below zero and maximum $+22^{\circ}$).

The wind woke up again and blew from a moderate to a fresh gale, with frequent storms of heavy snow.

We started off in a W.S.W. direction over the stony flats round the glacier-slope. I found three pieces of drift-wood about half a mile from the sea and at an elevation of fifty feet above the present sea-level, from which I cut specimens.* At 7 P.M. after travelling about ten miles, I reached the top of a slope covered with bowlders, about eighty feet above the sea, where the land terminates abruptly and glacier-face again begins. To our disgust I found open water stretching right up to the glacier-face which, if we are to proceed in a southwest direction, will force us to take to the glacier and climb the steep icy country to get on. The dog-team with Armitage was in difficulties about a mile behind, so I took out the pony, leaving the sledges upon the top of the rise, and returning to him gave the dogs a help on with the pony. I decided to camp, to give the mist a chance of lifting and to enable me to have a look round and see the best direction to take.

Armitage tells me he believes he saw a glacier and rock, bearing $304\frac{1}{2}^{\circ}$ from our morning's camp, through the mist; but when I came out of the tent to look at it the horizon had misted over still more and did not even partially clear again. I feel sure he is mistaken or we could not have failed to have seen it before.

Travelled W.S.W. about eight miles.

April 10th, Saturday.—Still warm (maximum $+29^{\circ}$, minimum $+22^{\circ}$ during the night), temperature at 9 A.M., $+27^{\circ}$, overcast and very misty, and we can see nothing in any direction. I named this spot Cape Nimrod, after the London club, under the hospitable roof of which I have spent many pleasant hours and where I have met with very much kindness. I made out at least four distinct raised beaches upon Cape Nimrod, the highest being about eighty feet above the present level of the sea.

* On examination under the microscope, three species of diatoms (and a worm), four algae, a snow-flea, and water-bear (*tardegrada*) were found.

† In this Mr. Armitage afterwards agreed with me.

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I placed a jack upon a seven-foot bamboo staff among the bowlders on the seaward side of the rise, close to our camp, and among the stones at the foot of it I placed in a spirit-tin a penny, three calling-cards, and the following record partly in pencil :

“THE JACKSON-HARMSWORTH POLAR EXPEDITION.

“Two members of the above expedition reached this spot April 9, 1897.

“We have met with open water reaching up to the glacier-face from out to seaward. We have here to travel over the glacier to avoid it.

(Signed)

“A. B. ARMITAGE.

“FREDERICK G. JACKSON,

“Commanding the Expedition.

“CAPE FLORA, *April 10, 1897.*”

I took several negatives of the camp and surroundings, and then started off in a S.S.W. direction obliquely up the glacier-slope.

This gave us very hard work, as the incline is at an angle of about 15° .

Armitage and I both put on our harness and hauled with the animals; but I soon found that we could only get on by attaching the five dogs and pony to one set of sledges, and then, after taking them up some distance, returning for the others. The animals stopped every five yards and we had the greatest labor to get them on at all, and it was only by the most strenuous exertions that we did so. I led in the traces in front of the animals, and Armitage tried hauling himself, but soon found that this did not answer, as they took advantage of his occupation to slacken off and he had to devote all his attention to urging them on. It was only by incessant shouting and pulling up of the sledges that they could be moved on at all. However, after reaching a height of about seven hundred feet the slope became more gradual and we got on better. On stopping for food at about eight hundred feet above sea-level we got clear of the mist, which lay below us like a dense white billowy blanket. We estimate that we had come about two miles.

The surface of the glacier was somewhat rough, the compact snow upon it being much cut by the wind into deep furrows and ridges, but had the appearance of being free from crevasses; still, being aware of the treacherous nature of such glaciers I felt

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anything but comfortable. We could, however, only push on and trust to Providence, as there was absolutely no indication on the surface to point out the yawning chasms that might lie beneath our feet.

We started off again on the same course and had gone about three miles farther when suddenly, without any warning or any indication on the surface to show its presence, the pony dropped all four legs into a crevasse and lay suspended over a deep black abyss upon a bridge of snow. Fortunately she was too fright-



OUR CAMP ON CAPE NIMROD

ened to struggle, or both she and the sledges would have disappeared. I at once passed the reins round her neck and tried to hold her up. Armitage, seeing what had happened, promptly came to my assistance, but unwisely stepping off his ski sank into the crevasse up to his arms. I must confess that the next few moments were anxious ones, as I endeavored to hold up the pony with one hand and to render assistance to Armitage with the other. He remained perfectly cool and collected, and fortunately managed to scramble out into safety. I then passed a line round the pony's neck, and we succeeded, after much pulling

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and hauling, in extricating her from her perilous position. We got the sledge over and then put the pony into the harness again. We had not proceeded a hundred yards farther before she dropped her hind legs into another yawning chasm, the black depths of which one could not fathom, but I got her clear without help. There is absolutely nothing on the surface to indicate these crevasses, not even a slight depression in the snow, which is sometimes the case, and even when one is made aware of their presence there is nothing to indicate the direction they take. Ski are a great protection when travelling over such glaciers. We laughed over the incident a few minutes afterwards, but at the time it was anything but pleasant, and we pushed on feeling that the next step might send us plunging down through the glacier hundreds of feet below, which would be a very effectual burial indeed.

A strong wind from southeast with driving snow shortly afterwards came on, but died down just before we camped at 9.10 P.M. I sounded all round our camp for crevasses with my ski-stick before pitching our tent, and arranged with Armitage not to go outside certain boundaries.

A moderate gale from southeast got up soon after we had pitched our camp, which increased in force as the night advanced. I secured the pony to a chain stretched on the snow between two sledges, and secured in the centre with our small crow-bar driven into the snow.

It seems to be constantly blowing from the southeast towards the glaciated land from the open water off the coast and back again. There is open water both north and south of us doubtless. The glimpse I had of the Queen Victoria Sea at our camp to-night showed it to be very open indeed, with only light, broken-up ice to be seen in it, and reaching as far as we could see to the west and northwest.

The temperature as we ascended fell from $+27^{\circ}$ at our morning's camp to $+7^{\circ}$ when we camped at 9.20 P.M., and still lower as the night advanced.

Travelled S.S.W. about seven miles.

April 11th, Sunday.—It has been blowing a strong gale all night from southeast, and when I turned out this morning it was still keeping up this force, with snow and a blinding drift of fine powdery snow cutting off all view at a radius of ten yards distant.

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Our sledges are buried out of sight, and everything looks the reverse of pleasant. We cannot travel in this weather, as the animals won't face it, and also it is useless to wander about in the semi-darkness of a blinding snow-drift and blizzard. The incline ahead of us and the pressure of wind against us would effectually anchor us even if the animals would attempt to pull, which they won't. We must camp until it improves, however irksome it may be. The gale continued throughout the day, increasing in force to a full gale at intervals and rattling and banging the tent about in a very ominous manner, but fortunately it stood up against it. We sat in the tent trying to keep the cold out as best we could and endeavoring to repair our now dilapidated mitts and put our gear to rights generally, only going outside to feed the animals and to do things absolutely necessary.

We are a month out to-day.

April 12th, Monday.—It blew and snowed hard all night but lulled early this morning, the wind backing to a fresh wind from the west with a temperature of $+29^{\circ}$ and thick snow falling and dense mist. Our furs are very wet, the hair is coming off them, and an intolerable stench fills the tent, as a result of the high temperature now prevailing; a fall of the thermometer will come shortly, and they will be as hard and unpliable as steel again, and worse than ever. The barometer is very low (28.38) and won't rise, so we are expecting a renewal of the gale every minute. Anxious as I am to get on, I shall wait a time and see what it means to do. I am much afraid of running out of food for the pony by exceeding our rationed time, and we do not know yet the length of the journey in front of us. The bad weather continued throughout the day, and from a strong wind, with driving and falling snow, it woke up again to a fresh gale towards night.

The pony has become very weak, and this vile weather will finish her. After we had turned in at night I heard her making attempts to get on her feet. As this continued without her doing so, I went out to help her, and soon afterwards was joined by Armitage. We tried for an hour in the howling gale and fiercely driving snow to get her on her legs, but she was too weak to stand, and we were forced to leave her after covering her up as warmly as we could in her blanket-coat, and giving her the last of the oats which I had been reserving. Poor animal, it's all up with her. If I had had proper food for her I should have got her

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ack all right. Oats and vegetables answer very well together, but dog-biscuits and vegetables are quite insufficient, and liable to cause derangement of the bowels as in her case, for both absorb water.

April 13th, Tuesday.—Poor "Brownie" lay dead this morning. She deserved a better fate than to leave her bones upon this dismal, silent glacier. She has been a good, faithful, and useful servant to us, and had become quite one of the family. I feel



DEAD-PONY CAMP

very sad about her. I had been promising her all sorts of good times if I could only get her back to London. No more work, but luxury for the rest of her days.

I am afraid it was a very depressed couple that sat in the tent this morning, which is not often the case, but I must admit that I do feel very melancholy about poor "Brownie," and feel her death keenly. With her, too, dies more than half our draught-horse, which is a serious matter. The fact of having kept her alive on the 80° of north latitude for 2½ years, a great portion of which time she had not ordinary horse food, shows that my idea of taking ponies was correct. That horses can live in an arctic climate and be of use I think I have now proved.

I got a bit of a chill the day before yesterday, and have a pain

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in my right side and feel distinctly seedy. The weather has improved, and the barometer has gone up a good deal during the night, but the mist is as dense as a hedge.

We shall now have to reduce our weights to the very lowest limits, and discard everything not absolutely essential to life and scientific work. Armitage and I set to work as soon as we had had breakfast to dig the sledges out of the drifts. This, as we have broken the little shovel and have only the blade left, was no easy matter, as the snow was packed hard, showing only a part of the bags on the very top of the sledges. I discarded three sledges and every article of our equipment we could dispense

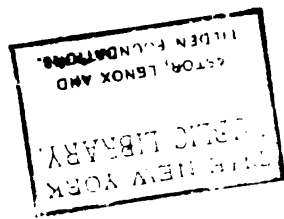


"POOR 'BROWNIE' LAY DEAD THIS MORNING"

with, and after I had photographed this wretched camp we loaded up three sledges. It is a sad time for us thus to see our animals die one after the other, to say nothing of the loss of draught-power, which renders progress at all very difficult, and we cannot even guess at the length of the journey in front of us. We have set out to go round this western land and mean to accomplish it somehow. We started S.S.W. with the three sledges. We soon found that we could not get along at all, as the team of five dogs did not move a hundred yards in half an hour. We then unpacked the third sledge and placed its load upon the sledges with the two canoes upon them, and took on each sledge about a mile and then returned for the other. I hauled in front of the

JACKSON AND ARMITAGE SLEDGING





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leading dogs for them to follow me and to steer a course, while Armitage hustled them up, and by incessant shouting and tugging at the sledges whenever they stopped, which they did every fifteen or twenty yards or so, started them again. I believe his work was the harder of the two; at all events, it was the most irritating. They took advantage of Armitage if he pulled also, so he let go his trace.

Just before we started, about 2 P.M., the horizon cleared, showing no land visible either to the west, northwest, or north. Our altitude was 1200 feet above the sea, and gave us a good view over the Queen Victoria Sea in these directions. Where is Gillis Land?

A strong wind from the southeast sprang up, with driving snow, making hauling against it, in addition to the incline, very hard work. We went about two miles and a half, rising 120 feet more, going thrice over the ground, when, as the weather grew worse, I decided to camp at 8.40 P.M. The wind soon increased to a gale. What a climate!

This southeast wind seems nearly continuous here, and is accompanied by a rise of temperature, resembling the fohn winds of the Greenland west coast. It began to snow heavily. I rigged a sledge sail as shelter for the dogs, but in the most perverse manner they immediately lay down upon the top of it and caused it to be immovably frozen into the snow and ice of the glacier.

Travelled S.S.W. two and a half miles.

April 14th, Wednesday.—Blowing hard and snowing all night, and this morning it hasn't improved in the least; the barometer is falling. We spent the day in repairing our gear and in smoking. Nothing can be more trying than this life of inaction when we are anxious to get on with our work, or the dreariness of delay, the weariness of doing nothing, especially when valuable time is spent in considerable physical discomfort. The wind blew from a moderate to a fresh gale throughout the day from southeast, with dense falling and driving snow and mist.

Our extreme view is bounded ten yards from the camp, and even the snow beneath our feet can only be indistinctly seen, owing to the dense white mist.

The thermometer is now falling.

April 15th, Thursday.—Blowing hard all night. This morning the wind showed signs of decreasing and changed to south, but

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veering to W.N.W. it woke up and blew a gale again. The barometer is, however, rising slowly, so we are hoping for something better.

We spent the day in darning mitts and socks with string—we have no other darning-cotton—and in repairing our gear generally. Towards evening the gale died down and the sky cleared we then set to work to dig the sledges out of the drifts and straighten things up generally. I repaired the fastenings of my ski, which had worn through.

The thermometer at 9 P.M. had sunk to 4° below zero from $+25^{\circ}$ F. at 10 A.M. These fluctuations of temperature are very troublesome, the warmth reducing our clothes, fur boots, and gear to a state of moisture, and then a fall of the thermometer comes and everything becomes of a steely hardness, rendering a labor of hours to get into our fur jumpers and boots, and making our equipment very unpliant and difficult to handle. Our under-clothes are reeking with damp when sitting in the tent with our furs on, which, when we go outside, at once become frozen and rigid. We try to dry our socks and mitts every night by placing them upon our chests, but this process is only partially effective and is not a very comfortable one. However it is the only means we have, although we occasionally use a little of our precious spirit to extract some of the moisture from the furs over the lamp. This usually ends in holes being burned, and more darning with string is then necessary.

April 16th, Friday.—Turned out at 6 A.M. to get an early start. It is still fine, but looks very threatening, with a south-east breeze and dark clouds in that direction.

I got a clear view from west through north to northeast over the Queen Victoria Sea, and see no land at all in any direction of shore. We are now at an altitude of nearly 1500 feet above the sea. Where is Gillis Land?—it cannot exist. What a part of the world it is for "Fly-away Lands!"

We started off in a southwest direction, I taking the lead in the traces in front of the dogs, going about three miles, when Nordenskjöld Bay, I believe, came in view, but it was very misty. The labor was excessive, and it was only by straining every muscle to the utmost that we could get along at all, even by going three times over the ground and taking on a single sledge at a time, and then returning for the other one and the

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nearly empty third sledge. This being entirely undiscovered country, an unknown land, with the dense mist cutting off the view at twenty paces distant, the difficulty of steering a course was great, and every few minutes I had to stop, take out my compass, and correct our direction. Seeing that we had struck the northeast corner of the bay, with either bowlders or broken-up glacier ice below us, I turned due west to reach Cape Mary Harmsworth, from which I hoped to get a view of any land to the west of it or off the southern shore. For a little distance, aided by the slight downward incline, we got along with the two loaded and one nearly empty sledges together; but after stopping for food the snow became so very deep and soft that in spite of our most strenuous exertions the dogs and ourselves could not move the sledges more than five or ten yards without stopping, and then it took us three or four pullings up of the sledges to start them on again. The dogs are played out, and "Bismarck," the leader, especially goes very groggily.

On finishing lunch at 2 P.M. we found the mist denser than ever, and a fresh breeze from southeast changing to south sprang up, with fine falling snow. We pushed on in semi-darkness until 5 P.M., when, the wind increasing and the snow driving, I considered it advisable to camp, out of consideration for our tired dogs and the fact that another gale was evidently imminent.

We came three miles southwest and about four miles west.

I hauled all day and Armitage whipped up the dogs and pulled up the sledges when stoppages occurred, which were incessant. We both had a hard day.

April 17th, Saturday.—It blew a strong gale through the night, with heavy falling snow. Our furs are all in an awfully wet and rotting condition and smell horribly. The inside of our tent and ourselves are moist in the extreme. The temperature at 8 A.M. was $+22^{\circ}$ rising to $+29^{\circ}$ by 11 A.M. A dense, wet mist cuts off all view at a distance of twenty yards, but the wind has dropped.

We are giving our dogs extra food, trusting to killing a bear. Our food we are economizing to the utmost extent, as we have only one week's rations and a little we have been enabled to save left, and we do not yet know how long we may be out, or where we shall be able to obtain more.

The dense mist continued throughout the whole day, and nothing whatever could be seen at more than ten yards distant.

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A thick frost rime forms upon everything, coating our clothes and equipment with ice, and the snow is very deep and soft.

There was little to direct our course by to-day, as it was quite calm and no sun was visible. I was obliged to steer by the direction of the sastrugi cut by the southeast gale, taking them obliquely and so travelling west. I would get off this horrible glacier where we are wrapped in the perpetual semi-darkness of dense mist and snow, if I could—which, together with the incessant gales and driving snow, renders it a perfect Arctic inferno—and travel on the sea ice below if there is firm ice there to travel upon. There may be less mist there, but it is impossible to find a way down the steep slopes until we can see a few yards in front of us. The barometer has been falling steadily all day. We went two and a half miles before stopping for food and a short rest, going three times over the ground—I, as usual, hauled in front of the dogs and Armitage whipped them up. We passed over several ugly crevasses, which were only discovered by a ski-stick being thrust into the snow, when it suddenly dropped, and would have disappeared altogether had we let go of it.

After lunch we went on again in the same dense, wet mist for a mile and a half, but being afraid of going too far, and of falling over the glacier-face into the sea before we saw it, I decided to camp at 6.40 P.M. and to wait for it to clear a little.

Travelled west four miles.

April 18th, Sunday.—It has been snowing heavily all night and is still as thick as ever this morning. The barometer, however, is slowly rising, so we hope for a better state of things. We have been out five weeks to-day.

About 2 P.M. the wind became northerly and the mist a trifle less dense. We spent the morning in cutting off the feet of our fur boots and skin stockings, which are soaking wet and rotten and smell like a neglected slaughter-house, and in trying to repair them.

I wrote out the following record to place on the cape to the south of us, and enclosed it in a spirit-tin, together with a jack and a penny-piece, and four visiting-cards:

[Copy]

“THE JACKSON-HARMSWORTH POLAR EXPEDITION.”

“Two members of the above expedition arrived at this spot on April 17, 1897, having taken a week to cross the Worcester glacier through bad

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weather and loss of our animals. We have now only five dogs left, our pony having died on the 12th inst.

"We are now returning to Cape Flora by way of Cape Neale. We have mapped in the whole of the northern coast.

(Signed)

"A. B. ARMITAGE.

"FREDERICK G. JACKSON,
"Commanding the Expedition."

About 10.30 P.M. I turned out in the hope of it being clear. I found that the mist had partly lifted, showing that we had passed to the north of the cape, which now lies due south of us. The sea runs right round Cape Mary Harmsworth, which is the most western point of Franz-Josef Land.

Looking out to the seaward I can see no indication of land in any direction, and the broken-up character of the ice is very much against the probability of there being any.

The dense black mist which lies lower down the glacier-slopes below us is like the smoke from a million chimneys, only denser.

CHAPTER XXIX

WATER, WATER EVERYWHERE

April 19, 1896, Monday.—The mist has again come up as before as ever this morning, but with the partial glimpse I got last night we can move south towards Cape Mary Harmsworth. This cape is a veritable "old man of the sea"!

The barometer has somewhat risen, and the wind is northerly which shows signs of increasing. We packed up and started down the incline due south, the dogs drawing the two sledges and a nearly empty one behind, with my help in the traces, at a good three miles an hour. At first the sun showed dimly through the dense mist, but it became totally blotted out soon after starting, and we travelled in semi-darkness, our horizon being a dim, misty circle with a radius of not more than ten yards; and sometimes the mist was so dense that we could barely see beyond the points of our ski distinctly. This combination of things in a totally unknown land, with the possibility of dropping into concealed crevasses at every step, which meant certain death, and the difficulty of keeping upon any definite course, was not the height of joy.

I then had to direct our way by the wind, which had become southeasterly, and by the faint sastrugi cut by a southwesterly breeze a day or two before, which was probably quite local.

After going south about five miles we could dimly discern a dark circle, which might be the edge of a glacier-face; and leaving the sledges to await my return, I ran down on my ski to investigate it, as I was anxious to get off the glaciated countenance which has given us such a bad time, on to sea ice again if possible. I rushed down the steep incline towards the indefinite something we had seen from above, when, to my surprise, I nearly ran into the open water of the sea, which I found quite broken up and full of a mixture of detached lumps and thin bay ice.

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just stopped myself going over the ice-precipice into the sea by slewing round in time, as the very thick mist prevented my seeing what the something was until I was right upon it. We had just passed several nasty crevasses, all concealed, one being only discovered by Armitage's seven-foot ski-stick suddenly sinking in up to the top on his driving it by chance into the snow. There was nothing for it but to keep along the glacier-face and risk the crevasses, which we could not see. The mist was so dense that nothing beyond three yards distant could be made out, and the frost rime covered us and all our belongings with half an inch of ice, making our clothes like sheets of steel, and the frozen edges of our woollen jumpers have, by chafing, cut our wrists and necks and made them very sore.

To skirt the glacier-face we had again to go up the slope, necessitating taking on single sledges with great labor, and retracing our steps. We went so about a mile and a half southeast. The wind then failed us; there were no sastrugi; the sun was not to be seen, and the mist as dense and wet as ever. I noticed a remarkable thing in reference to the moisture in the air—that, although the thermometer was considerably below freezing-point, it did not become changed into ice until it came in contact with something, such as our clothes or equipment.

There was absolutely nothing to guide us, our course being wrapped up in a dense blanket of mist; and to get on at all I had to stop and take out my compass every few minutes and correct our course, causing much delay. It is a remarkable thing that, without some object to walk towards or to guide him, a man has a tendency to walk in a circle; and this we frequently experienced when shrouded in mist, with neither wind nor sun or marks on the snow to help us. After going once about half a mile and returning for the other sledge, to our disgust we found we had nearly gone round in a circle, and on looking at the compass round we were heading northwest instead of southeast. The whereabouts of Cape Lofley is very much puzzling us, for if the way we had dimly seen a day or two ago was Nordenskjöld Bay we should have come across it.*

We now very cautiously proceeded a little north of east about five miles, keeping along the slope of the glacier, and going a lit-

* We afterwards found that it was lying beneath us concealed by mist.

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tle down the incline again, when seeing what appeared to be the edge of the glacier, I rushed off on my ski down the steep slope to see if it was so, and if there was sea ice we could travel upon. I had not gone far before I found a wide, open crevasse lying before me, which I saw just in time to stop myself running into. I slewed up and took the slope in a slanting direction toward what I could now see was Weyprecht Bay, with apparently some ice up in its throat, but with water and broken-up ice, and rocks and looms flying over it a little way out to seaward. I then turned to the sledges, and we started off down the slope after I had placed breaks upon the runners. The dogs, however, appeared to get frightened at the steep slope, and only would go by fits and starts, causing repeated capsize and giving us a very tiresome time. We would start the dogs and on would rush the sledges, almost without any help, when the dogs, utterly defeated at such an abnormal condition of things as sledges moving by themselves, would stand still to gaze in astonishment at the easily gliding vehicles and dodge on one side to allow them to pass, expecting to be run over. This would pull them up with a round turn, and over they would go, followed by howls from the frightened animals and, I am afraid, unparliamentary English from ourselves. Then, upon being urged on, they would start again, and the performance would be repeated, followed by another upset and further labor for us to get the overturned sledges upon their runners again, traces disentangled, and gear replaced.

After trying this method for some time, and finding that we could not get on, we took the dogs out, and I taking one sled and Armitage the other, we got them down to the glacier edge ourselves after many adversities, where, as it was now nearly 8 p.m., I decided to camp. The snow is very soft and deep, and without ski we sink above our knees at every step.

The aneroid indicates that altogether we have ascended 1400 feet, and the last slope was 700 feet.

At sea-level we find far less mist, and bearing southeast from us across the bay is Cape Ludlow, and to the south is Cape Loda on the other side.

We have now the satisfaction of knowing that we have rounded the extreme of western Franz-Josef Land, and that Gillis Land, unless it be a small island far to the northwest, does not exist.

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all. At all events, I feel sure that there is no such land in the position assigned to it upon the maps, or we must have seen it. The character of the sea ice off the land in itself renders it improbable. Thus our explorations entirely upset existing maps, and our route towards the pole as planned by land has been frustrated by the non-existence of it.

It is with heartfelt joy that we find ourselves off that horrible glaciated country, with its perpetual mists, howling blizzards, and incessant snowfall. We feel as if we had been living in a bad nightmare, from which we have just awakened, to find ourselves in a clearer atmosphere, where travelling is easier, and crevasses and steep glacier-slopes have been left behind, but our poor old pony and most of our faithful dogs have found their rest in that icy wilderness to the north.

April 20th, Tuesday.—The morning opened sunny and far less misty. A little east of south Cape Crowther shows up (bearing, magnetic, $138\frac{1}{2}^{\circ}$), and Cape Neale, a little more to the northward (magnetic 134°).

We in July, 1895, a little over-estimated the distance between Capes Ludlow and Lofley. Weyprecht Bay is about eight miles wide towards the head, surrounded by high glacier with a rugged face and small bergs at its head and sides, and at either side of the entrance a ledge of basaltic rock projects from the ice-cap. It is about eight miles deep.

I took bearings and made sketches, and also exposed several negatives. Just before we left, Armitage got a meridian altitude of the sun for latitude, which, with the bearings I have taken, will give us our longitude.

We then started off taking on a single sledge at a time, after a sapsize of one of the sledges in going over the glacier-face on the snow-drift. The snow is excessively deep and soft, and the ledge with the canvas canoe upon it gets quite buried at times.

went into the traces as usual. Armitage is anxious to take his turn at hauling, but he is such a good hand with the dogs that he cannot do better than where he is.

After going about a mile we got into very heavy, broken-up, rappy ice, with deep snow filling up the holes, into which a man without ski sinks to his hips. We had frequent upsets of the ledges, due to their being somewhat top-heavy, and through the numerous concealed pinnacles of ice catching the runners.

A THOUSAND DAYS IN THE ARCTIC

We had a heavy time generally. Our utmost exertions are incessantly required, otherwise the dogs at once stop, and it takes a vast amount of urging and hauling to get the sledge to move on again. We stopped for lunch at 4.15 P.M., of tea, biscuit, bacon, and then on we went again. It became quite overcast and very misty, and put out of the question the observation of longitude we hoped to get. We struggled along under great difficulties until 9 P.M., when we camped.

We have been for some days on half rations of many articles to enable us to economize our food.

The wind (force 4) has been from the south all day, with thermometer showing 12° of frost, but the air has been raw and moist, giving the feeling of being much colder.

I shall have to leave the canvas canoe, for we cannot get on at this pace at all. We have only five dogs now, and they are as weak as rats. We are short of food and are overweighted. After all our labor in its manufacture and in dragging it so far, the new canoe must be sacrificed. I hope we may not experience the want of it.

We accomplished about four miles southeast-by-south (true), having travelled twelve miles to do this.

The latitude of yesterday morning's camp is $80^{\circ} 29' 50''$ (roughly).

April 21st, Wednesday.—Overcast, misty, and snowing. After taking everything out of the canoe, we left her standing upon her sledge upon the floe, and packed everything upon the other two sledges.

I left a notice in the canoe, tied with string to one of her runners with a request to forward it to Mr. A. C. Harmsworth, London, when a reward will be given, as I think she has a slight chance of drifting out of the ice to the south, and of being picked up.

We started off with the only two remaining sledges, but soon found that we could only go ahead with single ones, as the snow was fearfully tumbled about, the snow between the hummocks very deep, and with absolutely no crust at all upon it. They plodded on by going three times over the ground, and even then with constant stoppages and incessant labor. We then got upon leveller ice, but only to find that it was very boggy. We crossed an open crack about thirteen feet wide, partly bridged with thin bay ice and a snow-drift, and seeing that the other

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er ran right up to Cape Ludlow ahead of us, and water shed the ice precipices fronting it, I struck east to again take the glacier to push on, where the joys of sledging upon it will be again; but it can't be helped. I went on towards the cape as far as I could by myself, leaving Armitage with the sledges, to see if by any chance we could squeeze round, but the crushed-up mixture of slushy snow and thin ice gave way with me, and in I fell, much to my disgust, for wet clothes are not amusing in this climate, especially when one has no fire to dry them.

I had considerable difficulty in getting out with ski on, but, fortunately, they also aided in keeping me up in the slushy ice and water, and aided by my ski-stick I clambered out. This quite satisfied me that we could not get the sledges round the front of the cape, so I returned to them, and proceeded northeast along the glacier-face, which is about forty feet high here, to find a place where a drift would enable us to get up it. This we found after going about a mile and a half, and Armitage and I, by great exertions, managed to haul up the sledges by means of a purchase and the little crow-bar. The glacier-face somewhat overhangs this point. Having had some food, we again proceeded southward up the steep rise of the glacier, with single sledges as before, being just as much as the dogs and ourselves could do to move them on at all.

Snow was falling thickly, with a southeast wind directly facing which made the going still harder; the mist also had become very dense. In this manner we proceeded until 10 P.M., when, as the dogs were utterly exhausted, we had to stop. We camped on the sloping edge of the glacier upon the western side of Cape Ludlow. Climbing these glaciers with sledges is killing work. We travelled southeast-by-south about one and a half miles, east about one mile, northeast about one mile, southeast one mile.

April 22d, Thursday.—Blowing strongly from southeast, with driving and driving snow, and as dense a mist as we have met with. Although we are only about four hundred feet up the glacier, frost rime is again coating everything two or three inches deep with ice. It is useless to try and go ahead in the dead end of mist, which cuts off all view beyond ten yards, and by travelling in it we should take a very erratic course, tire out the dogs, and stand a good chance of going over the glacier-face into the sea.

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We spent the day in repairing our gear. I darned my mittens with twine, as I have nothing better, and repaired my boots. We also dried some used tea-leaves to smoke. It is not quite satisfactory, and is a poor substitute for tobacco. Anyhow, it is warm, and the mere spark in the bowl has a cheering effect, but we cannot say that it is a good substitute. Still, men hard pushed will resort to anything, and accept every little change as a welcome relief to the deadly inaction of being cooped up in a mixture tent without room to stand. Armitage's tobacco gave out several days ago, and I am now sharing mine with him, so it will also soon be finished. I therefore wish to economize it as much as possible. We never smoke when on the march or when doing hard work, but only when camped in the tent.

The weather continued very bad all day, and grew worse as a fast-falling barometer towards night.

Just as we were finishing dinner, about 7 P.M., the dogs saw a very distinct yell of "Bear!" I quickly got my rifle out, and on opening the tent, saw her about fifty yards off coming along our tracks of the day before towards the camp. As she came I gave her a shot in the neck which did not immediately stop her, although I afterwards found that the bullet penetrated the neck, cutting a large blood-vessel, and filling the chest-cavity with blood. I quickly followed with two more shots as she made both taking effect, and one breaking her hip on the left side. She then fell down, but tried to drag herself towards the ground on her face, when, as I had fur boots on and did not wish to get them full of snow, and Armitage was wearing his leather "laipahs," I sent him to put a bullet through her head.

We then went down to her and cut her up and sledged the meat back to camp with the dogs, which viewed the proceeding with huge delight. I cut off as much meat as I could, and saved all the blubber for cooking purposes; she was, however, in good condition. We gave the dogs a huge dinner, and they had gorged themselves as full as they can hold, poor brutes. I was very glad to have got this bear, as it comes in extremely useful. This is the first we have seen since leaving the hut. She was an adult female. I took the claws and canine teeth as mementoes of the kill. It went to my heart to leave the skin behind, but of course it was quite out of the question to carry it.

April 23d, Friday.—The weather has not improved at all.

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the barometer refuses to rise. After having breakfast, as the mist lifted a little, Armitage and I started over the steep rise above Cape Ludlow to get a look into Cambridge Bay, to see, if possible, the condition of the ice there. On topping the slope Capes Neale and Crowther showed out dimly through the mist. It appears as if there was a way across the ice some distance up Cambridge Bay to Cape Neale, but the open water looks as if it wrapped round the cape. It was, however, too misty to be at all sure. We got a good run back to camp on our ski down the steep ice-slope with a fresh southeast wind behind us. I am feeding up the dogs and they are gorging themselves to their hearts' content. The rest and fresh bear-meat will do them good.

I changed the films in the half-plate and hand-cameras and altered the lashings on my ski, and did various odd jobs in the tent.

Our tent has become an absolute swamp, and everything we have about us is very wet. Pitched as it is upon the side of the glacier, the floor has a considerable incline downward, and we are constantly sliding down among our cooking utensils at the lower end, and it is difficult to prevent this involuntary toboggan-like movement. The wind increased again towards the afternoon, with more snow fall. The thermometers show about 10° of frost. Uncomfortable as the wet is, I now hope we shall have no very decided fall of temperature, as our furs will become unusable, and we shall be unable to get into them at all.

April 24th, Saturday.—The wind dropped somewhat during the day, but the mist still continues thick. We packed up after digging out the sledges, and carried as much of the bear-meat as we can manage to. We started with single sledges up the steep incline above Cape Ludlow, rising to about eight hundred feet. The weather soon after we started again became worse. Snow fell and a fresh southwest wind met us in the face. The temperature showed 16° of frost, which, with the atmosphere saturated with moisture, soon coated us and our belongings with a thick sheet of ice. The haul up the steep ice-slope was very hard work, and we had to stop every twenty or thirty yards. On reaching the summit and bringing up the two sledges together we stopped for food, and then started off with them to-

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gether, favored by the incline downward. This, however, not last long, as I had to direct our course N.N.E., and sometimes north, as the ice is broken up for some distance from Cambridge Bay. The mist continued very dense, and ten yards around in any direction bounded our vision. After going, I believed, sufficiently far to clear the open water and to get down upon the fast ice, we struck about northeast and began to descend rapidly. The dogs got scared at the sledges following upon them, slewed round, upset me, as I was attached to traces, and capsized the sledges. It had then come on to snow still heavier, and we could hardly see beyond the point of our ski, so I decided to camp until it clears, as I am afraid that this gloomy darkness we may fall over the glacier-face before we see it. The weather looks as ugly as it can and shows no prospect of improving. This is a truly diabolical climate!

We camped on the northeast side of Cape Ludlow and looking towards Cambridge Bay. We travelled about three and a half miles by various courses. The wind changed to S.S.W. before we stopped.

The dogs went badly, being gorged with meat, and gave me much trouble, and yet who would have the heart to refuse them as much as they can eat after all they have gone through, when there is plenty of meat and more than we can carry? But brutes!

There is a popular picture of dog-driving—of a man seated on a sledge twirling a long whip around his head and carrying along at the rate of ten or twelve miles an hour behind a team of dogs. This, unfortunately, is anything but a true one. We never think of riding upon a sledge, but are more than contented if it can be kept in motion at a slow walk by the united efforts of the animals and ourselves. I have to go in a trace ahead of the dogs and lead the way, while my companion, by continuous shouting and occasional use of the whip, keeps the dogs at their work, and whenever the sledges stop—which they do at the smallest obstruction—hauling and shouting gets them started again.

Climbing the steep incline of this ice-clad land entails excessive labor, hauling our sledges simply foot by foot, as the five remaining dogs stop every few yards, and can only be started again by hauling up the sledges and by shouting ourselves hoarse. The

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whip is of little use when every muscle has to be strained to move at all, and besides being repugnant to any one fond of animals, tends to discourage rather than to spur them on, and Mr. Armitage seldom uses it.

April 25th, Sunday.—Soon after we stopped the S.S.W. wind increased to a gale, with heavy snow, which continued throughout the night, and this morning it is blowing a fresh gale, with very heavy snow. The barometer has sunk over half an inch during the night, and now stands at 28.33 (10 A.M.).

We shall have again to camp until the weather shows some improvement. These wretched bad-weather camps are endless! It became worse instead of better as the day went on, and the wind increased to a strong gale in the evening and at times to a full gale. The barometer had fallen to 28.09.

The tent seemed at every moment to be on the point of being carried away in spite of our weighting it down with everything available, and sitting upon the bottom. In the course of the night the wind cut all the snow off the snow-cloth and lifted one side of the tent. The snow drove into it in clouds and rapidly covered us with several inches of it. I managed to secure it partly by turning the cloth inside and piling my rifle, our food, and other articles upon it, but shortly the wind blew up a corner and a steady drive of snow into the tent went on. We could not go outside to put it right, or the tent would have blown away, so we had to put up with it. Above the roar of the furious gale frequent howls and whines from the dogs showed that they were having an equally unpleasant time of it, and the poor wretches could not sleep. The temperature began rapidly to fall, with a change of the wind to northwest.

April 26th, Monday.—Our camp presents about as uncomfortable a spectacle as it is possible to imagine, the tent half full of snow, the sides bellied in, giving hardly room to stir an inch, and the constant flap of the canvas brings clouds of snow down upon us. Armitage's cheerful, plucky endurance under conditions of great privation and trial impresses me much. He is a capital companion to have, and I could not wish for a better.

We lay in our militzas until 1 P.M. listening to the roar around us, and to the whines and howls of the unfortunate dogs. Then hunger drove us out, and under great difficulties we got some food cooked over our smoky fat-lamp, and we again lay down, as

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space will not allow of any other position. We have all but run out of spirit, and are obliged to use the bear-blubber to warm our food with—I won't say cooked, for it is like trying to do so over very smoky candles, and its fumes fill the tent and make us the color of sweeps. I had tried to eke out our spirit with the small supply of whiskey we had been keeping for emergencies; but it does not burn well, and we rather regret the experiment. The little that remains of our spirit I keep for use when actually on the march.

About 6 P.M. the wind lessened to a moderate gale, and we were able to work to feed the dogs and to make our tent more habitable. Thus the day was passed in about as uncomfortable a manner as can be imagined.

The temperature has fallen to a degree or two below zero, and our dripping furs are now getting like suits of armor.

The barometer is rising, thank goodness.

April 27th, Tuesday.—I turned out at 2 A.M., and finding no improvement in the weather, I decided to make a start at once.

No sooner had we begun to get breakfast than the wind again woke up to a strong breeze. This, however, died down again, and a clear, sunny day opened up. I intend to march during every minute of fine weather vouchsafed to us, or we shall never get away from this wretched district of endless gales and bad weather. I intend to tramp on from the time one gale ends until another begins. I took several telephoto negatives of Cape Fridtjof Nansen, Neale, and Crowther. I made sketches and took angles of the prominent features of Cambridge Bay to fill in my map. I feel sure that it runs out to the northeast of our camp of April 7th, as I can now see up the channel I then discovered on going down to the shores of the small inlet of the bay. As the glacier appears to gently incline downward to the bay in the direction of Cape Neale, we started off with breaks on the sledges direct for it. We have only just gone far enough north-east to round the open water. After proceeding about three miles we approached close to the edge of the glacier fronting the bay, when, on my running ahead of the sledges on my ski, I found to my disgust that a high glacier-face from fifty to sixty feet high, without a single snow-drift against it to enable us to get down to the sea ice, skirts the bay. We were on a high shield-shaped, ice-clad land, fringed with a precipice of sixty feet above

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smoother sea ice which lay below us, and yet we had no means of descending to it owing to this high ice-wall.

We had now to a large extent to retrace our steps to make for the inlet in the bay farther north, where the glacier comes down abruptly. I started off ahead, skirting the glacier-face to the nearest way down, leaving Armitage to slowly follow in tracks with the sledges.

On returning, after achieving my object of finding a descent to the bay, I learned that Armitage had been having a bad time with the dogs which were drawing the sledges; finding them run only downward towards the glacier precipice, they had swerved at a run in that direction. Fortunately Armitage had only one sledge attached to the dogs at the time, and he just succeeded in stopping them on the brink of the perpendicular ice-walls by throwing himself in front of the runners. Another had fallen and they would all have been dashed to pieces upon the bottom of the bay beneath. One of his own ski, however, became detached from the sledge on which they were fastened, probably owing to the sudden check, and slid over on to the floe below, a distance of sixty feet at this point.

By taking the sledges singly for a mile and a half, and then rejoining for the other, we got them to the top of the descent into the inlet I had found, and about noon managed to get down on to the sea ice, to our sincere relief.

We then skirted the glacier-face for some distance, and camped for lunch on the edge of some very rough ice. I here left Armitage to make a pot of tea and to put the tent up roughly, while I started off to find his ski. This I did about a mile farther on. As I had that morning, as I could see by his tracks, followed the glacier-face round, going towards Cape Ludlow.

We got the sledges through the rough ice after some hard work, and then came upon a fine level stretch, over which, with frequent spells to rest the dogs, we went comparatively easily. I led as usual in front of the dogs, and by straining every muscle kept the sledges moving.

The barometer had again begun to fall, and dark clouds were rising up from the southeast, indicating clearly more bad weather in prospect. I determined to make the most of what weather still remained.

At 6 P.M. we stopped and had a little food, of tea, biscuit, and

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fat bacon, and then on we went again. The dogs had got very tired, and if unintentionally I relaxed my efforts in hauling for a moment they at once stopped, and any snow-drift to ascend at once produced the same effect, requiring all our efforts in pulling up the sledges and hauling on them to start again.

The ice now became extremely rough, with deep snow between the smashed-up pinnacly hummocks, giving us incessant labor to get on at all.

About midnight, when checked at some rough ice, and happening to turn round, I saw a she-bear followed by two cubs about fifty yards off, coming towards us from behind at a fast run. I hurriedly got out of my trace and ski, and pulled out my rifle, just in time to put a bullet through her head as she came up. It was fortunate that I saw her when I did, or she would have made it lively for us. She dropped stone-dead close to the rear sledge, and the cubs took to their heels on meeting with such an unexpected termination to their little hunt. Mamma-bear was evidently going to instruct them in the art of catching seals, or whatever she imagined the strange objects on the ice to be.

I then started off on ski to capture the two cubs, as I did not wish to leave them to die of starvation, and they were not old enough to delve for themselves. The young beggars ran like hares, and not feeling inclined for a race after the day we had had, I returned and got my rifle, and by stalking the young villains I put a bullet through each, sorry as I felt to do so. If I could have caught them I would have tried to utilize them as draught animals, and so have enabled them to prove their use in life; but I expect there would have been awful rows about it.

If the mother would have left us alone I should not have meddled with her, but as she was determined to make a supper of us I had no option. Having killed the mother I felt it was cruelty to leave the cubs to starve (they were only about two months old). I took the claws and canine teeth of the old bear and the fore paws of the cubs as mementoes, and gave the dogs a feed on the meat. We then started on again. The tumbled-up ice and deep snow now became worse than ever, and about 2.30 A.M. I found that, with our utterly exhausted dogs and ourselves a bit tired, it was out of the question to force our way through it without a rest all round. It had come on to blow strongly from the south-east, with driving snow, and the weather looked very threatening.



OUR LUNCH CAMP UPON CAPE NEALE

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WATER, WATER EVERYWHERE

We have quite used up all the brief spell of fine weather, and another gale is imminent.

At our camping-place, about seven miles off Cape Neale, I ascended a hummock to look for the best way through the rough ice, when to the south (true) I saw a dark object on the ice a mile or so away. I got the telescope, and found it looked uncommonly like a dirty tent, with something waving in front of it like a small flag on a staff. I called Armitage, and he came to the same conclusion. The light, however, was so bad, and the snow driving before the wind at times completely hid it, so we could not say what the object was. I took a bearing of it, and as soon as the gale ceases I intend to go and investigate the matter. Can it be the *Fram* party?

We had some food, and then turned in. With the fall of temperature everything is as hard as rock, and we had awful work to get into our furs, which took us over two hours to accomplish.

We have had twenty-eight hours of it without a break, twenty-five being spent in sledge-hauling. We are pretty tired. We have the satisfaction, however, of knowing that we have covered a good distance through sheer hard work. We have marched twenty-seven miles altogether, which, I think, is a very good record considering the conditions.

The very heavy gale we experienced on the 25th and 26th, when upon the high glacier about 1200 feet up, does not seem to have blown nearly as hard on the ice in Cambridge Bay, where the snow lies soft and almost undisturbed; whereas upon the glacier it was packed hard by the wind, and cut into deep ridges and trenches by its force. The wind evidently rushes from the comparatively warm open water to the south of us towards the high, cold, glaciated country.

April 28th, Wednesday.—It has been blowing a moderate gale from southeast all the time we have been asleep, with thick driving snow, and when we turned out at 4 P.M. it still continued. The sky is overcast and heavy with thick mist, and the weather looks as unpleasant as it well can do. It won't give us half a chance.

I wrote the following record to place in our camp-cairn upon Cape Neale to-morrow, with three cards, if we can only get on:

A THOUSAND DAYS IN THE ARCTIC

"THE JACKSON-HARMSWORTH POLAR EXPEDITION."

"Two members of the above expedition reached this spot on April 29, 1897, having rounded Western Franz-Josef Land by way of the British Channel, the North Coast, and Cape Mary Harmsworth. We have been much bothered with bad weather and open water, and have been frequently forced to travel on the glaciers to avoid it.

"We have lost all our animals except five dogs. We are now returning to Cape Flora by way of Cape Grant and Bell Island.

(Signed)

"A. B. ARMITAGE.

"FREDERICK G. JACKSON,

"Commanding the Expedition."

I melted down for cooking purposes more of the blubber I got from the bear killed on the glacier. The one I shot yesterday had not an ounce of fat upon her.

The wind dropped late in the evening, but the sky remained overcast with a good deal of mist, and snow fell.

The supposed tent turns out to be a dirty piece of fresh-water ice shaped exactly like one.

April 29th, Thursday—We turned out at 4.10 A.M., after four hours' sleep, as I could see that the weather had improved, and I was anxious to get off again.

After taking several negatives of the camp and Cape Neale and a telephoto one of Cape Fridtjof Nansen, we started off with single sledges through extremely rough ice towards Cape Neale. In places we had to make a road through it with our small cross-bar. Frequent capsizes with the sledges occurred, and I was heartily relieved on reaching the cape to find, on getting on to a small level floe which had been protected from the southern pressure by grounded bergs, that neither sledge was broken. Certainly rougher or more difficult ice there is none in the polar basin than that through which we have come, being crushed against the land and tumbled over and over in the wildest confusion.

We travelled round the front of the cape on the level floe which, however, was sticky from salt efflorescence, and the sledge dragged heavily. We put up the tent for an hour for lunch at 4.30 P.M. by the cairn at our old camp of July, 1895. At Cape Neale we heard again the hum of birds from roches upon the cliffs. The sound has great charm for our ears after our sojourn in the silent, lifeless, deathlike country of ice and snow to the

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northwest, where the cry of a bird was never heard, but all was as still as the grave. Bears had pulled out the piece of drift-wood which we had stuck in the top of the cairn ; had hauled down the flag on the cairn on the rise of the talus, and had pulled down the drift-wood we had firmly put on end near the shore. They are mischievous wretches. I took several negatives here, and we then pushed across the ice towards Cape Crowther. At the termina-



SKIRTING THE GLACIER FACE

tion of the level floe, half a mile from Cape Neale, we came upon, if possible, worse ice than we had met with on the other side of the cape. We pushed into it, but found it was so bad that we returned, and I determined to follow the glacier-face round upon the snow-drift, which, although anything but good, we got along on better. At the foot of it I noticed numerous tracks of bears—a regular bear promenade, in fact, and that I always view as an indication of the best way, for bears are very good judges.

We pushed on until 9.30 P.M., when we camped opposite some

A THOUSAND DAYS IN THE ARCTIC

low basaltic rocks that jut out of the glacier about half way between Capes Neale and Crowther.

The weather after 10 A.M. has been beautifully fine, and with the exception of local winds from the cliffs and glacier there has not been much.

The temperature fell from $+32^{\circ}$ when we left camp in the morning, and showed 27° of frost when we stopped at night. It fell to zero later on in the evening.

We had a hard and long day—viz., from 4.30 A.M. to 1.30 A.M. the following day, when we turned in to sleep. We only stopped once for an hour, at 4.30 P.M., to have some biscuit, tea, and beer.

We did about thirteen miles direct, but went much farther, the greater part of the distance we went three times over the same ground.

April 30th, Friday.—Another fine, sunny day. What a marvel! I took a series of negatives of the coast between Cape Neale and Crowther. We then packed up and started toward Cape Crowther along the glacier-face. The going was extremely bad, and frequent capsizes of sledges and going treble journey was the order of the day.

We reached the western portion of Cape Crowther at 9 P.M. when we stopped and had some food.

The ice is in a tremendously crushed-up condition, smashed up into pieces and tumbled about in the wildest confusion, with nothing approaching floes or even level spaces of ten yards across among it. Rougher ice there cannot be anywhere, and only against land or a land floe could it be so crumpled up, for there the maximum of pressure occurs, and not in the open sea with little to check the movement of the ice before the wind. All round Cape Crowther the ice was piled up against the shore, giving us great trouble and hard work to get forward. The dogs stopped at every incline, and could only be moved on again after a vast amount of hauling and shouting.

I examined the record-cairn on the top of the low rocks at Cape Crowther, and found it quite intact, but that a bear had wrenched off the flag, leaving part of the staff among the stones. I stopped during the day and took several negatives of objects of interest.

We pushed on round the small tongue of glacier that runs down between the rocks at Cape Crowther, and at 1.30 A.M.

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camped on the edge of the shore beneath the cliffs on the Gray Bay side of it.

The open water runs in close up to Cape Crowther and goes some distance up into Gray Bay.

On the northwest rocks of Cape Crowther there is a large loomery, also rotches, kittiwakes, and dovebies were flying about



OUR CAMP ON CAPE CROWTHER

the rocks. It is very pleasant to hear birds again after the silence of the dismal northern and northwestern coast we have travelled over so long, where there was no sign of life except a very occasional rotche seen at a distance. Now the looms are cawing and we seem to have entered a region of life again.

The barometer has been falling all day, and the sky had become overcast by 9 P.M. with an easterly wind when we turned in at 4 A.M., it having backed from west at 8 P.M., through southwest, southeast, to east. We travelled about eight miles.

A THOUSAND DAYS IN THE ARCTIC

We often think what travelling over this kind of ice must have been for Albert Markham and his brave party to the north of Grinnell Land, and Beaumont on the Greenland coast, with heavy sledges and most of their men ill with scurvy. What pluck and hardihood they showed, of the true British mettle, as day after day they slowly and laboriously struggled on in the face of great odds and almost insuperable difficulties. The non-arctic public little realize what those marches really meant, the splendid courage that secured their accomplishment, and the fine generalship of the leaders which brought their men back with such comparatively small loss.

May 1st, Saturday.—The wind has been blowing in heavy gusts from the east since 4 A.M. yesterday, and when we turned out about noon they had increased a good deal in force and frequency, being almost continuous, with falling and driving snow and dense mist. The barometer has been falling rapidly, and there is every appearance of our being condemned to another "bad-weather camp." We have had, however, two fine days, so we mustn't growl, I suppose.

The weather quickly became worse and compelled us to remain camped. The interior of our tent is emphatically the reverse of comfortable. Everything we have about us is in a state of not some moistness; our clothes are very damp, our furs are wet and rotting, and cause a fearful stench. The smoke from the fat-lamp, which I made out of an old tin, has blackened everything, and when in use fills the tent with volumes of black, greasy smoke. It is very annoying to be thus delayed, for, besides the discomfort of such camps, I am anxious to get back to the hut on Cape Flora to refit and start for Hooker Island, to map in the country in the neighborhood of Brady Island. The ice will soon get very bad for travelling, and time is getting on.

May 2d, Sunday.—It has been blowing a fresh gale all night, with almost continuous heavy gusts of force 10, with thickly falling and driving snow, and as thick a mist as I have ever seen. The barometer has fallen nearly half an inch during the night, and this morning the weather is vile.

The fat-lamp is making a horrible mess of everything in the tent, volumes of black, greasy smoke being given off whenever it is lighted. This mixes with the condensation of snow and frost on the sides and top of the tent, and showers black rain down

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upon us on the sides being touched until we begin to look like negroes, which the wash I take every morning only partially relieves. We have been sitting in the tent endeavoring to keep ourselves warm, and doing any odd jobs, such as repairing the dog harness, that comes to hand. Armitage and I have almost talked ourselves conversationless. Our discourse naturally has, as a rule, reference to Arctic matters, the splendid sledge journeys made by McClintock and his able assistant, Allen Young,



IN DIFFICULTIES

the retreat of Leigh Smith and Dr. Neale in their boats to Novaya Zemlia, or Payer's adventurous and plucky journey up Austria Sound, all and everything is discussed threadbare. Then we lapse into silence, until some brilliantly new idea occurs to one of us, and the conversation is renewed.

The weather eased down somewhat towards night, and the wind changed to northwest and blew in hard gusts, caused by the high cliffs above us.

May 3d, Monday.—It has been blowing in hard gusts throughout the night, which increased in force this morning, so that to prevent the tent being lifted up we had to weigh it down with

A THOUSAND DAYS IN THE ARCTIC

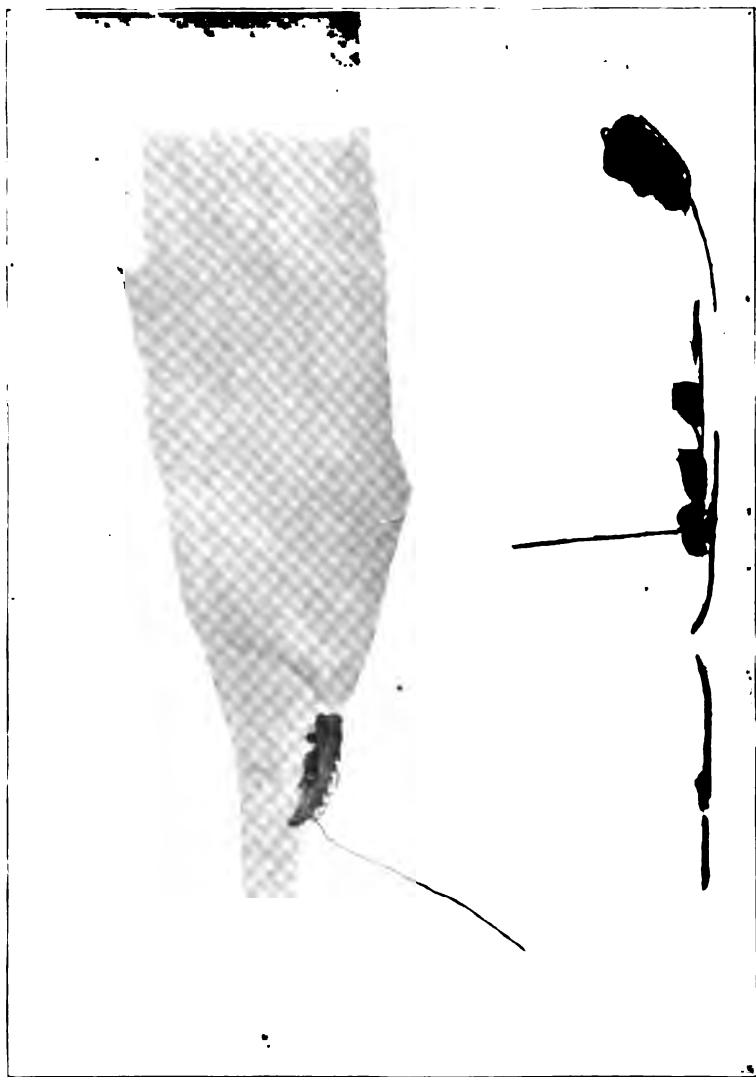
heavy stones off the cape. Owing to the wind chopping round a lot of fine snow has been driven in through the entrance, covering everything inside, which is soon converted into water, owing to the rise of temperature. Things are not exactly the acme of comfort, to say the least of it. The barometer is slowly rising and the temperature falling (the thermometer has been racing up and down lately from freezing-point to 10° below zero). We hope the weather will soon enable us to move on again.



"MUCH TO OUR DISGUST, WE SAW THE OPEN WATER"

Towards noon the weather improved, and we packed up and started at 12.40 P.M., pushing on round the cape close to David Island and across Gray Bay towards Cape Grant, edging away some distance down the bay to avoid rough ice and open water. Things went very well, as the travelling was good, until 6.30 P.M., when we neared the glacier running up to Cape Grant; there, much to our disgust, we saw that the open water extended right up to the glacier-face, quite cutting us off from rounding the cape.

Armitage got some food ready while I set out on ski to try and find a snow-drift against the glacier-face, up which we could haul



CLIMBING THE GLACIER-FACE

DATTONS.

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sledges and enable us to cross the high glaciated land behind Cape Grant into Nightingale Sound.

I found that canoeing our gear round—about a mile, so far as we can see—was out of the question, owing to the probability of the narrow water space closing up with the tide or wind before we had half finished, and after the banging about my canoe has had, I doubt very much if she is water-tight, but, I expect, leaks like a sieve; the water, too, may wrap round the cape, and Nightingale Sound may be open water also. I found that there was no place where it was possible to get up the glacier-face nearer than close to the head of Gray Bay, so after having our lunch we started off to climb the glacier, much as it is to be avoided, but there is no help for it. After going about seven miles I found a difficult and steep place formed by a drift against the face of the glacier where it is about fifty feet high. It was, however, possible, so we set to work at it. We had to proceed very carefully, owing to ugly crevasses between the glacier itself and the drift, which led down to the tide-crack and the sea sixty feet below, from which a man would never escape if he fell into it; and on the other side was the precipitous face of the drift, with a narrow ridge between, along which we had to drag the sledges. However, after an excessive amount of hauling and tugging, which took us hours, inch by inch we at last got them up without accident, and having harnessed the dogs again, we started up the steep glacier-slope with a single sledge at a time. This the dogs and ourselves drew with the utmost difficulty, the steepness of the incline causing the dogs to stop every eight or ten yards in spite of our strenuous exertions.

After taking the first sledge up five hundred feet, I noticed a bear on the floe below making for the sledge with our provisions upon it, which was standing at the top of the glacier-face. As we could not afford to entertain a visitor of his capacious appetite, I rushed back down the glacier upon my ski with my rifle to stop his plundering intentions from being carried out, and as we have now no want of meat, and I did not wish to kill him unnecessarily, I yelled and did my best to scare him. He at last moved off without robbing the sledge, and walked leisurely towards the open water to the south.

We then proceeded about another hundred and fifty feet higher, and bringing up the two sledges together, camped at 2.45 A.M.,

A THOUSAND DAYS IN THE ARCTIC

having marched for fourteen hours, and had a pretty tough day of it.

We travelled in all twenty-one miles direct.

May 4th, Tuesday.—The day opened misty but fine, and the temperature shows 18° of frost. I took a few negatives of Cape Crowther and the coast, and we then started up the steep incline with single sledges, which took us all we knew to move at all. The dogs stopped every five yards, and only after great hauling



ON THE PEARY GLACIER

and tugging could we get the sledge on again. I hauled in front as usual, but took my ski off at the steepest parts to get more power to bear upon the snow.

We at last got the two sledges to the top of the dividing ridge. The top is flat for only about two hundred yards, and then the downward slope begins, two and a half miles from Gray Bay, and we could then see over into the bay to the west of Cape Stephen—which I named Josephine Peary Bay, after Mrs. Peary, the wife of the Arctic explorer—as well as into Gray Bay. We then pro-

WATER, WATER EVERYWHERE

ceeded down a more gradual slope into the bay, and only at one part of the descent were brakes on the sledges necessary, but the glacier is more crevassed than on the Gray Bay side. I went on ahead here to find a way down, the dogs following in my ski tracks. We got down on to the sea ice again at 8.30 p.m. at the head of Josephine Peary Bay, and then pushed on to the point of Cape Stephen. The open water comes close in here round Cape Grant and runs right up to the Cooke Rocks.

Near our old camp of August, 1895, we stopped for a few minutes and had some food. While Armitage packed up I went up the talus to examine the ice towards Bell Island. The open water extends in a crescent-like form some distance up Nightingale Sound, obliging us to make a considerable detour towards the north. We trudged on, but found the floes very deep in snow and boggy in places. Mist came up which quite hid Bell Island, and heavy snow-storms with a southeast wind hindered us somewhat. We pushed on, I in the traces hauling and leading the way, and Armitage bustling up the dogs, which went very slowly and laboriously. About three miles off Cape Stephen we saw a bear coming at a rapid rate towards us from the northward. I got out my rifle, but as he approached he adopted more cautious tactics, and began leisurely to stalk us. As we had no time to spend over him I fired a shot or two at a long range, and cleared him out, and we then went on again. The floe was exceedingly heavy with deep snow. The sledges hauled badly, and in places there was water beneath the snow.

Mist had obscured all land, and I had to lay my course towards Bell Island by the direction of the wind and the trend of the open water about a quarter of a mile to the southward of us. Snow began to fall heavily, but we struggled along as best we could, both the dogs and ourselves being very tired, the former nearly dead beat, until 4 a.m., when we stopped for an hour and made some cocoa with luke-warm water over the fat-lamp, and then on we trudged again.

Armitage and I began to feel a little tired too, for we had been at this work for sixteen hours, and several times when the dogs checked at hummocks we laid down in the snow and all but fell asleep. However, it was of no use lying there, so on we pushed again, but the labor of hauling the sledges out of drifts, starting the team again, and urging on the animals in-

A THOUSAND DAYS IN THE ARCTIC

sured our sleeping soundly when the time came that we might feeling quite indifferent as to whether our couch was downy or otherwise.

About 9 A.M. of the following day the mist partially lifted and the snow stopped falling, showing us Bell and Mabel Island about four miles distant. As we approached nearer we could make out a dot on the spit of Bell Island, which very slowly became larger, and eventually proved to be Leigh Smith's hut. We at last reached it at 11.30 A.M. (of the 5th of May), and after



A REST ON THE MARCH

digging away the snow-drift with my canoe-paddle we got inside and proceeded to make ourselves comfortable, and to satisfy our thirst, which required three quarts of cocoa and coffee, which we had left there in 1895, to do it. We suffered greatly from thirst on this journey, and our tongues and mouths were constantly as dry as a rasp. I have lived in tropical countries and know what heat is, but nowhere have I suffered so much from thirst as when sledging in the Arctic. To replace our dirty smoky fat-lamp with spirit, two tins of which we had left there in August, 1895, is also a great boon.

WATER, WATER EVERYWHERE

What a relief it was when we stood before Leigh Smith's hut : here at all events we could stretch our limbs and stand upright under cover, for, bare as it was, it was a palace to what we had been accustomed to. We groped about for possible treasures, and we were rewarded—well rewarded—for we discovered a few ends of cigars and cheroots thrown away by Mr. Smith's party fourteen years before, which we eagerly cut up and smoked, and



BREAKFAST IN THE HUT ON BELL ISLAND

never probably was any tobacco more appreciated than those few odds and ends that day, for we had been out of tobacco for some time past. We had turned out at 10 A.M. on the 4th and started at 11.45 A.M., and continued our march until 11.30 A.M. of the 5th, it being in all close upon twenty-four hours' continuous hard sledging. After having a little food we felt as fit as possible again. We travelled in all twenty miles direct. We are both of us much thinner than when we left Cape Flora, but

A THOUSAND DAYS IN THE ARCTIC

are in first-rate training and as hard as nails. Three years in the Arctic evidently has not hurt us much.

We had been here about four hours, had some food, straightened things up generally, and were on the point of going to sleep when, hearing the dogs barking, I got out my rifle thinking a bear was approaching. Armitage, who had looked out of the door, returned to say that three figures were approaching, which soon proved to be Dr. Koettlitz, Wilton, and Bruce dragging a



AN ARCTIC HIGHWAY

sledge. They had become anxious about our being overdue, and had formed a possible relief party to look for us, carrying provisions for us. As we were out of tea, sugar, tobacco, etc., which they were able to supply, we soon revelled in the midst of luxuries. Strict economy was at an end, and big feeds the order of the day. We formed the jolliest party in the world; our new was eagerly inquired for, and many were the congratulations expressed at the success of our journey.

All had gone well during our absence, and every one was in



THE FIVE SURVIVORS OF THE SPRING SLEDGING (1897)

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WATER, WATER EVERYWHERE

and well. The party had left Cape Flora two days before, and had camped off the coast of Mabel Island the first night.

May 5th, Wednesday.—After discussing our news we turned into our furs at 9.30 P.M. The weather had become bad, with an easterly wind and falling snow. Only one bear had been seen at Cape Flora during our absence, and he had escaped.

The doctor and his party insist upon cooking and doing everything for us, and are most kind in every way. We feel in clover indeed.

May 6th, Thursday.—Blowing hard from the east, with falling and driving snow and thick mist. The thermometer has fallen to 7° below zero during the night. I intend to remain under cover here until the weather improves, and Armitage and I are congratulating ourselves on not being out in another bad-weather camp on the floes between here and Cape Stephen. We quite feel that our exertions of yesterday are rewarded. It can blow and freeze as hard as it likes now.

May 7th, Friday.—The day opened bright, clear, and colder, with a northeast breeze. I took a number of negatives, bearings, and sketches of points in Nightingale Sound. I left a note upon the wall for the *Fram* party, if by any chance they should reach here—the most likely spot if they make for Franz-Josef Land :

“ *To the Leader of the ‘Fram’ Party:*

“ The Jackson-Harmsworth Polar Expedition are now living on Cape Flora, where there is a hut and plenty of provisions. Communicate at once with us should you arrive here.

“ FREDERICK G. JACKSON,

“ Commanding the Expedition.

“ *May 7, 1897.*

“ I have left provisions in this hut for you.—F. G. J.”

We then packed up and started for Cape Flora. An easterly wind had got up just before we left, which, as we neared the land, rapidly increased to a gale, with driving and falling snow.

The dogs went well, although the floes are very deep with snow, but they seemed to understand that the journey and their privations and hardships were nearly over for the present, and certainly they recognized Cape Flora. The rest and big feeds of the last two days have done them a lot of good.

A THOUSAND DAYS IN THE ARCTIC

We stopped for lunch about three and a half miles from Cape Flora, and reached there at 10 A.M. of the 8th of May (Saturday). Heyward saw us coming and met us on the floe, and I learned from him that everything had gone well.

The weather had become worse as the day advanced, in spite of a rapid rise of the barometer in the evening. Every one is pleased at the success of our journey.

Heyward had seen two bears since the doctor and party had left to look for us. I left a large quantity of provisions at Eira House for the use of the *Fram* party in the event of their reaching there. I consider it to be the most likely spot in the country for them to make for, as they know of this hut.

POSITIONS BY OBSERVATION OF ☉

MADE ON SPRING SLEDGE JOURNEY, MARCH 15 TO MAY 8, 1897

March 22d.	Latitude per Meridian Altitude	= 80° 31' 49" N
" 23d.	" " " "	= 80° 37' 20" N
" 25th.	" " " "	= 80° 40' 00" N
April 4th.	" " " "	= 80° 48' 32" N
" "	Longitude per Chronometer	= 49° 17' 17" E
" "	Worked with Latitude	80° 48' 00" N
" 5th.	Longitude per Chronometer	= 48° 25' 21" E
" "	Worked with Latitude	80° 47' 00" N
" "	Declination	= 13° 53' 33" E
" 7th.	Latitude and Longitude per Sumner's method of double Altitude	= 80° 52' 05" N = 46° 53' 55" E
" "	Declination	= 13° 38' 36" E
" 13th.	Latitude per Meridian Altitude	= 80° 35' 40" N
" 20th.	" " " "	= 80° 29' 38" N

A. B. A.

ABSTRACT OF WEATHER ON SLEDGE JOURNEY MARCH 15 TO MAY 8, 1897

MIERS CHANNEL.—March 15th.—Left Elmwood at noon of March 15th in calm, fine, clear weather, almost cloudless sky, and temperature at 21° F. which decreased to —30° at 4 P.M., and —40° at 8 P.M.

March 16th.—We camped off Windward Island, and on turning out found the weather completely changed, a moderate northerly gale blowing, the temperature —10° F. and still rising, till at 8 P.M. it was —4° F. the wind at that time rapidly decreasing. There was a very thick mist, with

WATER, WATER EVERYWHERE

overcast sky and falling snow during nearly the whole day. Max. thermometer -10° F., min. -40° F.

March 17th.—On turning out found that the sky was still overcast with mist, but only light northerly winds blowing (unsteady between N.N.W. and N.E.). Continued overcast, thick weather throughout the day, some snow falling towards evening.

March 18th.—Light airs and winds from N. through E. to S.E. to-day; generally overcast, thick weather, but occasionally clearing overhead for very short periods of time.

BRITISH CHANNEL.—*March 19th.*—Light to moderate wind, veering from east, through N. to N.E. during the day. Overcast, thick weather throughout, occasionally clearing as yesterday. Temp. between 0° and -5° . Max. $+0.5^{\circ}$, min. -5° .

March 20th.—Light airs and winds from N.E. throughout. Generally overcast, clearing and clouding at intervals, showing fine clear weather overhead, and thick mist with fine falling snow below. Temp. -9° . Max. -4° , min. -7° .

March 21st.—Calms and light airs and winds from N.W. throughout. Fine and clear until 4 P.M., when it clouded over once more, and again became thick. The temperature fell to -23° during the day.

March 22d.—Light airs and wind, blowing unsteadily from all round the compass during the day. Overcast, and very thick weather throughout, with falling snow.

March 23d.—Calms and light airs throughout. Overcast and very thick in early part of forenoon, but quickly cleared and became very fine for the remainder of the day, the temperature falling to -33° F.

March 24th.—During the night we could hear hard gusts of wind blowing round the tent, and the snow driving thickly, and found on turning out a fresh gale blowing from N.W., so did not break camp. The gale continued during the day, moderating towards night, the thickly driving snow having buried our sledges. The sky was fairly clear. Temp., max. -8° , min. -36° .

March 25th.—On turning out the weather was overcast and gloomy, but there was no wind; the sky cleared, and there being generally a promise of a short spell of fine weather. At noon a light S.W. wind sprang up, which quickly increased to a strong gale, with very thick mist and falling snow. However, on rounding a point of the glacier we were comparatively sheltered, the wind only reaching us in furious gusts, driving the snow round us in a perfect whirl, so that we could not see more than three yards in any direction, and had perforce to camp. Temp. throughout, -12° F.

March 26th.—Had heard heavy masses of snow falling from glacier during the night, which caused the sea to flood the floe where we were camped, so had to shift (after digging out our completely buried sledges) in a strong

A THOUSAND DAYS IN THE ARCTIC

S.W. gale farther on to the floe, and again camped under the lee of some crushed-up ice. Temp. about -12° throughout.

March 27th.—Light S.E. winds; very fine and clear throughout. Temp. rose to $+10^{\circ}$, but fell again to -16° by 8 P.M.

LEIGH SMITH SOUND.—*March 28th.*—Similar weather. Light air (S.E.) and calms. Towards night became cloudy. Clouds driving rapidly overhead from S.W. Temp. about -21° F. throughout. Max. -6° min. -26° .

March 29th.—Moderate S.W. gale blowing throughout day, overcast sky, thick mist and falling snow. Max. -5° F., min. -23° F. Weather moderating at 6 P.M.

OFF NORTHERN COAST ON QUEEN VICTORIA SEA.—*March 30th.*—Fine clear weather throughout. Calm and light easterly winds in forenoon. Moderate to strong wind in afternoon. Temp. -18° , min. -36° . Clear overhead generally, but not being able to see land around us because of driving snow, did not break camp.

April 1st.—Wind veered from the W. through N.W. to N., blowing vigorously and light to fresh breeze, and finally becoming calm at 8 P.M. Fair clear overhead, but mist hanging about low down. Temp. ranging between -20° F. and -30° F. during the day. Max. -22° F., min. -45° F.

April 2d.—Light N.W. and W. winds, and fine clear weather throughout with much refraction. Max. -27° F., min. -42° F.

April 3d.—On turning out there was a light W.S.W. wind blowing. Sky very cloudy, threatening, rather thick low down. Broke up camp, however, and proceeded. Temp. had risen to -7° F., min. being -46° F. (lowest on this journey). The wind quickly rose to moderate, fresh, and strong gale, the sky being overcast, with thick mist and falling and driving snow; this continuing till 1 P.M. of 4th inst., when it moderated, and quickly decreased to light W.N.W. wind.

April 4th.—Light to moderate westerly wind, fine clear weather till 1 P.M., when it became again thick. Max. -30° F., min. -10° F.

ON NORTHWESTERN LAND.—*April 5th.*—Calm and fine clear weather until 6 P.M., when the sky quickly clouded over, and a fresh gale from the S.E. quickly sprang up, with very wet falling and driving snow, becoming so thick that we could not see how to shape a course, although on land. The temperature rose to $+9^{\circ}$. This continued till 2 A.M. of the 6th inst. when the gale moderated.

April 6th.—Gentle to light N.W. and W. winds, and fine clear weather. Temp. again fell to -30° F.

April 7th.—Calm and light N.W. wind, fine and clear weather till 5 P.M. when the sky quickly clouded over from S.E., and by 10 P.M. a fresh S.E. breeze was blowing, with thick falling, driving snow. Min. -40° F.

April 8th.—During last night the wind was blowing in fierce gusts from the S.E. with occasional lulls, and on turning out, it was blowing a moderate

WATER, WATER EVERYWHERE

ate to fresh gale, with driving snow. Overcast and very thick. The temperature rose to $+26^{\circ}$ F., making everything very wet.

April 9th.—A moderate S.E. gale blowing generally throughout the day. Overcast and very misty weather.

ON WORCESTER GLACIER.—*April 10th.*—Light S.E. wind, thick mist, and overcast. As we ascended the glacier a continuous S.E. wind was blowing unsteadily, which increased to a gale at midnight.

April 11th.—Strong S.E. gale throughout, overcast, very thick, and very thick falling and driving snow, which buried our sledges entirely.

April 12th.—Moderate westerly wind throughout, overcast, and very thick, with falling and driving snow.

April 13th.—Calm in forenoon, clear overhead, mist low down, light to moderate S.E. wind.

April 14th and 15th.—Cloudy with mist until 10 P.M., when it became overcast with thick mist, the wind increasing to a gale at 11 P.M., which continued till 9 P.M. of the 15th inst., when it moderated, veering through S. to W., and gradually decreased to calm at 6 P.M. Overcast and exceedingly thick, wet falling and driving snow during the whole of the 14th, gradually clearing on the 15th inst., until at 6 P.M. it was very fine clear weather.

ABOVE CAPE MARY HARMSWORTH.—*April 16th and 17th.*—Fine and clear, with much refraction in early morning, clouds passing rapidly over from south. Sky quickly became overcast with thick mist at 2 P.M., the wind increasing to moderate southerly gale at 6 P.M., and moderating to light breeze at 8 P.M., breezing up again to fresh gale at 11 P.M., and throughout the night until 7 P.M. of the 17th inst., when it moderated to light breeze at 8 A.M., and calm with thick mist at 10 A.M. Fine but very misty, with light to moderate southerly and southeasterly winds the remainder of the day.

DESCENDING PAYER GLACIER.—*April 18th.*—Light airs and winds from E. and N.E., with dense mist and thick frost rime over everything, so thick to-day that we were unable to move, as we were descending the glacier and did not know how far we were from the glacier-face. Weather cleared overhead in the afternoon, but still thick below on glacier. Saw a large double fog-bow at noon.

April 19th.—Gentle to moderate S.E. wind throughout; overcast, with dense mist and thick frost-rime. Found it very difficult to keep our course on account of the very thick weather.

April 20th.—Gentle to moderate southerly and southeasterly winds, clear in forenoon, becoming cloudy, overcast, and misty in afternoon.

IN WEYPRECHT BAY.—*April 21st.*—Gentle to fresh S.E. wind, with dense mist, and falling and driving snow and sleet.

April 22d.—Fresh wind to fresh gale from S.E. Barometer falling rapidly. Overcast and very thick. Falling and driving snow throughout.

A THOUSAND DAYS IN THE ARCTIC

April 23d.—Moderate to strong wind, and occasionally gale throughout. Overcast and thick with driving snow throughout. Snow falling in latter part of afternoon and during night.

April 24th.—Fresh to moderate south and southwesterly wind, with overcast, very thick weather, and falling and driving snow.

ASCENDING AND DESCENDING PAYER GLACIER.—*April 25th.*—Moderate to strong gale throughout from S.W., veering through W. to N.W. Overcast, thick weather, with thick falling and driving snow.

ON PAYER GLACIER ABOVE CAPE LUDLOW.—*April 26th.*—Strong whole and moderate gale from N.W., moderating at 8 P.M. in furious gusts which cut the snow off the tent snow-cloth, blowing up one side of tent and filling it with snow, also giving us some little trouble to keep the tent from being blown away. Overcast and cloudy weather generally, with fog and hard driving snow. Temp. fell to -10° F.

IN CAMBRIDGE BAY.—*April 27th.*—Calms and light northwesterly air with fine, clear weather overhead, fog low down till 6 P.M., when it became cloudy and overcast, with every promise of S.E. gale. Temp. 0° F. to -12° .

April 28th.—Moderate S.E. gale, and overcast, thick weather throughout day, moderating in the evening, and becoming calm by midnight. Temp. -12° to -22° F.

OFF CAPE NEALE.—*April 29th.*—Calm till 5 P.M., then moderate N.W. wind; very fine and clear throughout.

CAPE NEALE TO CAPE CROWTHER.—*April 30th.*—Fine, clear weather generally throughout the day, clouding over towards midnight, and the wind blowing over in sharp gusts from the northward and eastward. Barometer falling.

OFF CAPE CROWTHER.—*May 1st.*—Moderate gale from east throughout overcast, thick weather, with falling and furiously driving snow. Fierce gusts of wind every other moment caused us to place all available weights (boulders, etc.) on tent snow-cloth.

ON CAPE CROWTHER.—*May 2d.*—Fresh east gale, with fierce squalls and wind every other moment, overcast, dense mist, falling and furiously driving whirling snow till 4 P.M., when it moderated, though still very squally and ugly looking. Barometer very low.

ACROSS GRAY BAY AND ON THE PEARY GLACIER ABOVE CAPE GRANT.—*May 3d.*—Moderate to gentle breeze, veering from N.W. through N. to N.E. Fine, clear weather in forenoon and until 10 P.M., when it became cloudy and misty.

CROSSED GLACIER, JOSEPHINE PEARY BAY, BETWEEN THE COOK ROCKS, CAPE STEPHEN, AND NIGHTINGALE SOUND, REACHING EIRIK HOUSE, BELL ISLAND.—*May 4th.*—Light N.E. wind, veering through E. to S.E., and increasing to moderate breeze, cloudy, with some mist throughout. Temp. -7° to -15° F.

WATER, WATER EVERYWHERE

LIRA HOUSE, BELL ISLAND.—*May 5th.*—Moderate S.E. wind, backed E. at noon. Cloudy, overcast, and thick throughout, with falling and sometimes driving snow the greater part of the day.

May 6th.—Fresh to strong E. wind, and overcast, thick weather, with falling and hard driving snow, until 8 P.M., when it moderated and cleared. Morning with fine, clear weather at midnight.

LIRA HOUSE TO CAPE FLORA.—*May 7th.*—Light easterly airs, increasing to moderate breeze at 4 P.M., and moderate to fresh gale at 11 P.M. from E.S.E. Fine, clear weather until 4 P.M., when the sky commenced clouding over, and as we approached Northbrook Island it became entirely overcast, with falling driving snow.

Days out, 54: Fine and clear, $13\frac{1}{2}$; $40\frac{1}{2}$ bad days. Fine, clear days, $13\frac{1}{2}$; but thick, $4\frac{1}{2}$; thick days, $29\frac{1}{2}$. Falling snow, $20\frac{1}{2}$; gales, $18\frac{1}{2}$.

CHAPTER XXX

WE LOSE OUR PROVISIONS

May 8, 1897, Saturday.—We arrived back at the hut at 1 A.M. to-day, having left Eira House, Bell Island, at 4 P.M. on the 7th.

We had some food, straightened things up a bit, and turned in at 8 A.M. At 2 P.M. we had breakfast. It was still blowing a gale from E.S.E., with thick falling and driving snow.

I set to work to develop negatives and to clean my cabin which had got fearfully dusty.

In the evening we had a feast to celebrate our return and success of our journey. The doctor made a cake, which, if quite a success, was much appreciated. Heyward attempted the best "plum-duff," and a little of our port-wine was produced. Every one was very kind in offering congratulations, and altogether a pleasant evening was spent.

May 9th, Sunday.—I developed negatives taken on the journey and find they are coming out well. Armitage started to work out observations for position taken then. On weighing the militza I find that its weight has increased from 10 lbs. (its normal dry condition) to 27 lbs., from wet. Our sovieks and breeches are in a similar state of moisture and weight.

Winds S.W. 2, W.S.W. 2, S.W. 3, W.S.W. 3 to 4. Overcast and mist all day until 8 P.M., when the sky cleared $\frac{1}{4}$ th.

The temperature stood at $+32^{\circ}$ to $+34^{\circ}$ all day, and the hoar started to drip.

The snow outside begins to thaw rapidly and water stands in small pools under stones upon which the sun shines.

At the hut they have experienced totally different weather to what we did to the northwest. It has been much milder here as a rule, and very little wind. They had none of the low temperatures we experienced.

WE LOSE OUR PROVISIONS

May 11th, Tuesday.—The others went for a run on ski after breakfast. I attended to my negatives, swept out the hut, and then went on ski to the top of the east glacier. I then went on developing negatives up till 4 A.M., which are turning out very well. Some have curious markings upon them which at present I am quite unable to account for. I took eighty half-plate negatives and one hundred quarter-plates on the late sledge journey.

May 17th, Monday.—On turning out this morning I heard sounds of barking on the floe. I sent Armitage, who had his boots on, to look over the bank and ascertain the cause, as I expected that it was a bear. He returned to say that the pups and "Gladys" were barking at a bear which had clambered upon a



A GROOVED BERG OFF CAPE FLORA

small berg off Leigh Smith's hut. I hurriedly put on my breeches and coat over my pajamas, and, taking my camera and rifle, Armitage and I started off. I sent Wilton on ski with a rifle to get round her and cut off her retreat to the open water if she should get away from Armitage and me.

We found that the dogs had fairly "treed" her, but every now and then she made vicious charges down the sloping side of the berg at them. As I approached I took several negatives of her.

A THOUSAND DAYS IN THE ARCTIC

and when within about forty yards, as she seemed uneasy at our coming up to her and inclined to bolt, I fired, putting a bullet through her head, and she came tumbling head over heels down the berg, making a very pretty sight. She was a young she-bear, fully grown, and in fairly fat condition.

After breakfast we all went down, taking the dog-team with us, including the pups we are breaking in, as we are so short of



"AFTER BREAKFAST WE ALL WENT DOWN, TAKING THE DOG-TEAM "

draught-power, and sledged her up to No. 2 hut, where Armitage and I skinned and cut her up. I want this meat badly, both for ourselves and the dogs. Tinned meat is not as good as fresh for either, and they had been out of bear at the hut for a long time. They had shot no bears during the two months we were away. I took a number of negatives of sledging the bear up to the hut with the half-plate camera.

She had a large quantity of grass and cochleria in her stomach, but no animal matter.

May 20th, Thursday.—There being an improvement in the weather at 2.50 P.M., we started, after eleven days spent in re-fitting and in breaking in some puppies to sledge work, with nine dogs (the five survivors of our late journey, two young bitches, "Miss Råwing" and "Judy," and two nine months' old pups) and a couple of sledges for the southeast corner of Hooker Island, which I named Cape Cecil Harmsworth, from the summit

WE LOSE OUR PROVISIONS

of which I hope to be able to map in Brady Island and the neighboring country which is undefined. I was obliged to press these insuitable animals into the service, as I have no others. I trust some dogs will come by the *Windward*, as well as ponies, for use next spring.

All the party started with us on ski to give us a hand over the east glacier; we found the going good, as the late thaw had



"AND SLEDGED HER UP TO NO. 2 HUT"

melted the snow, and the ten or twelve degrees of frost we are now getting has frozen a good hard icy crust upon the snow. A rise of temperature would soon convert it into slushy water, however, and in places—in Gunter Bay and elsewhere—there have been large tracts of water standing on the ice. The weather has been overcast, and a threatening sky extends from northeast, through east, to southeast, but with little wind.

We camped for lunch about 7 P.M. three and a half miles south of Camp Point.

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I then discovered that the waterproof floor-cloth for the tent had been omitted to be packed. The doctor pleased me very much by offering to return to the hut for the cloth, and if we would camp at Camp Point offered to bring it on before we leave to-morrow morning. I decided, however, to go without it.

When passing Camp Point I went up on to the plateau, which is to a large extent already clear of snow, and made examinations and looked for anything of scientific interest.

We pushed on across De Bruyne Sound until 2 A.M., when a bear was seen following our tracks, and we stopped to give him a reception. He, however, altered his tactics and began to leisurely stalk us, so I decided to spend the time in putting up the tent and getting our camp ready, keeping an eye on "Mr. Bear" the same time. He eventually took the same view of us as a fox did of the grapes, and considering discretion the better part of valor, went off towards Windward Island.

I took a round of angles at our evening camp. We traveled twenty-one miles. I soon found that the dogs required many traces ahead of them, and we reverted to our old method of proceeding. The others returned to Cape Flora, leaving Armitage and me to go on alone.

May 21st, Friday (and 22d.)—We turned out a little after 10 and got under way at 3 P.M. The weather had changed for the worse; it was overcast, misty, and snowing frequently, and the newly fallen snow made it sticky going. We, however, pushed on at a good rate for about six hours and then stopped for lunch at 9.20 P.M., with the old depot bearing about N.N.E. distant about four miles. The weather had become very thick and snowy; I, however, tried a couple of photographic negatives on the coast, extending from the old depot to the western extreme of the typical glacier descending between the rocks on the western side and Cape Cecil Harmsworth. We plodded onward through the snow and dense mist. To the south we could make out May and Etheridge Islands, and what we believe to be Newton Island farther east.

On approaching the glacier-face near Cape Cecil Harmsworth the ice became exceedingly rotten, with water on the surface in every direction extending right out towards the open water, which reaches up from Cape Barents, touching Etheridge and May Islands, and appears to come inside Newton Island. There

WE LOSE OUR PROVISIONS

also a lot of open water off the eastern extreme of Hooker and between it and Brady Island.

The ice as we advanced became more and more dangerous, but it was our only road, and I hoped that it would enable us to reach the cape in safety, although every moment I grew more and more uncomfortable. When within four hundred yards of the shore the "Mary Elizabeth" sledge suddenly broke through the ice both runners from stem to stern, making a large hole



IN MILITZAS

found it at the same time. It was kept from sinking by the dogs in front and the sledge behind keeping a strain upon it. The driver also went through partly on his ski, but managed to get clear. The ice proved to be only about an inch and a half thick, with three inches of slush and an inch of white snow over it.

This was a very unpleasant predicament to be in. All our food was upon this sledge, and we were far from the hut upon Cape Flora. The ice, too, was in a most dangerous condition, so

A THOUSAND DAYS IN THE ARCTIC

much so that when I saw the sledge break through I stepped off one ski to endeavor to haul it out, but found that it was so rotten and thin that without my ski it would not bear me. The great length of these snow-shoes (7 ft. 9 in.) distributed my weight over a greater surface. We both felt that if either of us got in there was little chance of his ever coming out again, as the ice was very thin for a long distance around.

Armitage and I then tried to drag the sledge out by hauling at it upon our ski, but had to desist, as the extra pressure put upon the ice during this process so bent it down that the water came bubbling to the surface, and in a few seconds more we should have gone through and joined the fishes.

We then held a short council of war, keeping a strain upon the hauling trace meantime to keep the sledge from sinking. We decided that it was quite impossible to drag it out entire as it was, so set to work to remove articles from the rear, where the ice was somewhat sounder. This Armitage effected by cutting open the rear sledge-bag while I held up the bows with the trace. Then came the job of getting at the next sledge-bag which was nearer the centre of the hole. This was no easy matter, but by kneeling upon my ski I managed to get near enough to it to cut it open and jerk the dripping articles out upon the ice one by one; every now and then having to beat a retreat when my weight, as I reached forward, beat down the ice and brought the water up. Armitage meantime whipped up the dogs to keep the sledge as near the surface as possible and prevent it from sinking altogether. I then cut the straps securing articles to the sledge with a knife tied to the end of my ski-staff and with this lifted off the tent and militzas.

This alteration in the weights on the sledge caused it to turn over on its side, putting the ration bags still farther under water. At considerable risk I managed to approach near enough to the front bag to cut it open and get out a tin of tea. I could, however, recover nothing else, as the bag of sugar which lay upon the permost carried away on my attempting to pull it out. I found it was utterly impossible to drag out any of the ration bags, for when dry they weighed between fifty and sixty pounds each, and now when soaked with water this weight might be multiplied by four.

I pushed the ration bags clear of the sledge with my ski-stick

WE LOSE OUR PROVISIONS

and then, with the help of Armitage and the dogs, got the sledge out of the water on to the ice. The ration bags sank to the bottom. We have now no food except a little biscuit, cheese, and bacon which had been put out so as to be handy for lunch, and even this is all soaked with salt-water, as likewise our cartridges.

On getting clear all the articles I could save we went back over our tracks a short distance, and I set up the half-plate-camera to take a photo of the scene, but as the dark slides and all my plates have got wet—the weather, too, is very misty, overcast, and snowing, and I dare not step off my ski—it was photog-



OUR LOST PROVISIONS

raphy under difficulties. There was nothing for it but to retrace our steps, as the ice appeared worse, if possible, towards the shore. This we did with momentary anticipations of a ducking, which would very probably mean a drowning also. The dogs were, of course, awkward and frightened, and immediately stopped on the least difficulty occurring, which was very untimely when fast movement forward was our greatest safety. We reached at last, after a great deal of shouting and whipping up of the dogs, a seal-hole in the ice which we had previously passed, and at which point we had imagined the ice to be quite sound; but on measuring it at the side of the hole, I found it to be only five inches thick, with a foot of snow over it. It was the

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newly fallen and still falling snow covering thin and sound ice alike with one even white mantle that deceived me as to the full extent of its rotten condition.

In spite of our loss of provisions I felt very loath to return to Cape Flora without completing the coast of Brady and McClintock Islands, so I made a course for the "old depot," intending to camp there, and to-morrow to proceed on ski alone over the glaciers of Hooker Island to the dividing ridge overlooking Cape Lewis-Poole,* Royal Society's,† Brady and McClintock Islands. By going on very short commons we may make our little food carry us through, but it will mean forced marches and hunger.

On approaching the shore the ice again became very thin and boggy, and I soon found that a wide band of it stretched all along the coast, quite cutting us off from it, and preventing the carrying out of this plan. Owing to the loss of our food and the cold also, except a broken bag of a small quantity of their meat, a speedy return to the hut is imperative, and there is no help for it.

I could neither see nor hear a single bird upon the rocks at Cape Cecil Harmsworth, so food could not be expected there. Fish and bears are very uncertain quantities; our cartridges, too, are soaked, so we could not be sure of killing anything.

As we found it out of the question to reach Hooker Island near the eastern end, and not having a canoe, which we are unable to carry with our weak draught power, and consequently had to leave at the hut, we ran very considerable risk of being cut off should we have reached it. I decided after a talk with Armitage to give up Brady Island for the present, and, unless the same tiresome arrangements have been made with the captain and officers as last year, I intend to go in the *Windward* round there in July, when I will get them to put me somewhere upon the southern shore of Brady Island, and a ten mile ski run ought to show me all I wish to see; from there we shall proceed north up the British Channel.

We now started back on our old tracks, determined to make forced marches and lessen the time of living as much as possible.

* Named by me after Mr. D. Lewis-Poole.

† Named by me after the club in London which has done so much to aid the cause of science.

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on salt, wet biscuit, and dog-meat. It is poor sledging fodder. On reaching our luncheon camp at 8.15 A.M. of the 22d, we stopped, roughly put up the tent, cooked some dog-meat, and dried our handful of soaking biscuit. We then pushed on again. The dogs went well with their weights reduced by about three hundred pounds. At 4.15 P.M. we passed our camp of the morning of the 21st, and as we were going well, and were still fresh in spite of our long tramp, we pushed on for another mile and a half,



F. G. JACKSON MAPPING

ising the ice-face around Camp Point. We then camped and tried to dry some of our soaking equipment.

I stopped twice when the mist cleared during our march, and took a round of angles.

We have travelled since we left our morning camp of the 21st twenty-one and a half miles, and marched for twenty-five and three-quarter consecutive hours, so we are in capital training. We mapped to the northeast of Camp Point.

We feel much disgusted at not being able to finish this small corner of Franz-Josef Land this season. This is the second time

A THOUSAND DAYS IN THE ARCTIC

we have been stopped here, and from the same cause. It is a wet spot.

May 23d, Sunday.—We packed up, still feeling very hungry, after a good sleep and a small feed of the little that remained of our wet biscuit and dog-meat, and made for Camp Point. I took a round of angles and a number of negatives with my quarter-plate camera—all the half-plate films are soaked. I went up on to the plateau at Camp Point and looked around again for anything to collect. I got some moss and other vegetable matter, in which to search for small animal life, and hunted for anything of geological interest, but without much success. I saw no indication of this being a raised beach.

The plateau is about two hundred feet high, with the ice-slope running down on either side of it. Numerous ringed-seal holes were to be seen in the ice of the small bay, which must have been kept open all through the winter by these animals. I measured the thickness of the ice in one, finding it to be a little over three feet. The current runs very fast to the southward through Miel Channel, which accounts for the thinness of the ice.

We pushed on towards Cape Flora, with a thick mist and signs of bad weather coming on, and as we ascended the east glacier began to blow from the north and to snow heavily. We ran down the east glacier near the Gully Rocks after putting a brake on the sledges, and reached the hut a little after midnight, covering over twenty miles to get back. I found that the doctor and Bruce had left for a short expedition to Bell Island and Cape Forbes.

I am looking forward to doing a lot of good work in the summer when she comes; soundings and dredgings in the fjords can be easily accomplished, as well as much geological and geographic work. I trust the advice I sent home may produce the desired effect of having her placed at my disposal this summer for a few weeks.

CHAPTER XXXI

HOW WE KEPT THE QUEEN'S JUBILEE

May 24, 1897, Monday.—We arrived back at the hut at 12.30 A.M., having done ninety-two miles in three marches. It was snowing heavily, with thick mist, as we ascended the east glacier from Gunter Bay. We had some food directly we got back, as we felt simply ravenous after our scanty feeding and long marches, and then turned in and slept the clock round like rocks. We never enjoyed sleep more! Armitage and I got our gear, which was soaked with salt-water, into the hut, and hung it up to dry. I then set to work to develop negatives taken on our journey to Cape Cecil Harmsworth, which I am agreeably surprised to find undamaged, although all the unused plates and films are spoiled.

As we were on the point of having dinner about 9 P.M. a bear appeared at the flag-staff, no doubt attracted by the waving jack hoisted in honor of the Queen's birthday and the sixtieth year of her reign. We had spent nearly three years up here, only once having had communication with the outer world in all that time, and were not very certain of the dates: still, we did know it was about sixty years since she ascended the throne. The dogs, however, scared the bear before we could get a shot, and although I followed him as far as the big berg to the southwest, he soon increased his distance from me and took to the open water.

We had a bottle of the little that remained of the few bottles of champagne sent us last year for dinner, and rum and milk afterwards followed to drink the Queen's health. Her birthday no doubt has been kept by us farther north than anywhere else in the world.

We feel *especially* loyal to-day, and we are all gratified that we have been able to give her name—Queen Victoria Sea—to the frozen ocean to the north of these islands.

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I proposed the toast, "The Queen, God bless her," which we drank with enthusiasm.

The climate is very Arctic here, but no warmer or more loyal hearts can be found than amid the snows and ice of this silent frozen land of the north. May her flag extend from pole to pole!

Winds N. 1 to 2 (4 P.M.), E. 1 to 2. Sky clouded $\frac{1}{10}$ ths to $\frac{2}{10}$ ths. Overcast (all but $\frac{1}{10}$ th), misty, and snowing at 8 P.M.

Wilton this afternoon and evening has been much troubled with snow-blindness, and his eyes are weeping very badly but without much pain.

Armitage and I have not been troubled at all, and even when sledging we found no need to wear goggles.

May 25th, Tuesday.—I set Wilton to work again at the bear-skin in No. 2. His eyes are now nearly all right. I did a variety of odd jobs, and in the afternoon I made a number of silver prints from negatives recently taken. Armitage cleaned of rust some of the articles taken on our trip to Cape Cecil Harmsworth.

The doctor and Bruce returned at 9.30 P.M.—both very snow-blind, which had brought their trip to an end, and looking very down-on-their-luck indeed, poor chaps! They had camped in the hut upon Bell Island for twenty-four hours, closing up the windows to keep their eyes in darkness until they were well enough to return to Cape Flora, which they did directly they were able.

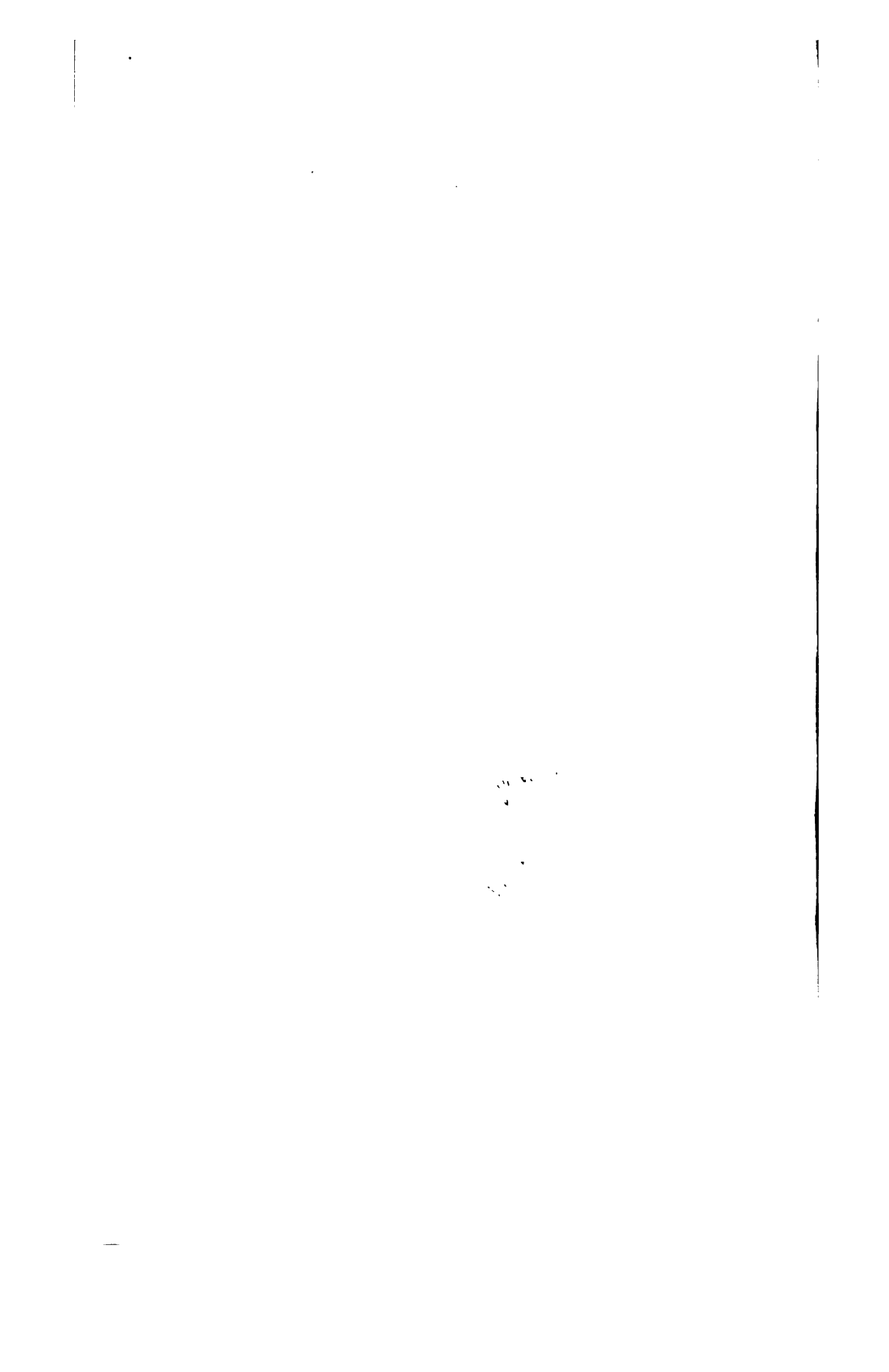
May 31st, Monday.—Bruce went out to the hole in the floe, where the ice had been stocked through (ice five feet thick), near the large berg, and took up his trap-net. He got a new fish (*Cyclopterus*) with a sucker upon its under surface, and several urchins, worms, and starfish. We have now three species of fish, all of which are very small. I have seen none in the water since we arrived here. And all the fish we have collected have been obtained by shooting looms bearing small ones in their beaks, with the exception of the capture to-day.

June 2d, Wednesday.—All went for a short walk this morning. I went on with my photography. Armitage entered up the workings of the astronomical observations for position taken on the late sledge journey round western Franz-Josef Land.

June 4th, Friday.—I went out to the hole in the floe made to



HOLE IN THE FLOE FOR COLLECTING MARINE LIFE



HOW WE KEPT THE QUEEN'S JUBILEE

collect marine life, and devised a net to set there. The doctor and I went for a ski-run to the top of the east glacier after tea.

Wilton went on straightening up No. 1 hut and in clearing snow and ice out of it. The doctor worked at the bear-skins. Armitage wrote up the magnetic observations.

June 5th, Saturday.—Bruce went down to the hole on the floe to examine his traps, and I sent Wilton down with him to lend a hand in putting more planks around the hole to render the edge safer. He then worked with the microscope upon the drift-wood I brought back from the coast of western Franz-Josef Land. He found a new worm in it to-day. I began to make my new map of that portion of the country from bearings I took during our late sledge journey.

June 7th, Monday.—After I had done my usual morning's work I went out to the hole on the floe and helped to collect marine life, and then went on to the water's edge, where we used the drag-net for the same purpose. Among other life a new shrimp (large) was taken in the trap to-day. I continued making my map.

Bruce found further life in the drift-wood that I brought back from northwestern Franz-Josef Land; among others a snow-flea (dead) and water-bear (*Tardigrada*), the latter of which is new for Franz-Josef Land.

It is remarkable how these lowly organized animals can stand the severe cold of winter.

June 8th, Tuesday.—After breakfast I went up the talus and shot nine looms, which are enough for dinner for two days. The spots that are bare of snow are still very hard and slippery, making climbing difficult and rather risky. I had to cut steps after going half the way up. I could see none but drift-ice to seaward beyond the land floe from the top of the talus.

Bruce, after going as usual to the hole on the floe, worked at the zoology with the microscope. He found to-day a new diatom among the drift-wood I brought back from northwestern Franz-Josef Land.

The kittiwakes are now building, and I noticed that the buntings had paired several days ago.

Winds N.E., force 4, all day. Sky clouded $\frac{7}{10}$ ths to $\frac{8}{10}$ ths.

June 9th, Wednesday.—After breakfast the doctor, Wilton, and I harnessed up the dogs to a sledge, and went round to the north

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end of Windy Gully to bring to the hut the fellow to the large whale's jawbone I sent home last August. I carried the half-plate camera, and took two or three telephoto views of Windward Island and Camp Point. The snow was very cloggy, making the sledge and our ski run heavily. We got back at 7.30 P.M. We ascended the glacier that runs off the rocks of Cape Flora to examine a bare spot on which are earth and broken pieces of basalt. We found it to consist of moranic material, and could find no other fossils but one lump which appears to contain plant-remains.

Bruce went on with his zoology. He got a new large shrimp in the trap this morning (22 specimens), two pieces of coral (white), and another large shrimp like the one obtained yesterday.

Armitage shot a Lapland bunting (female) this morning. Two brent-geese were seen to fly west soon after breakfast, so I sent Wilton after them with a gun. He succeeded in shooting one. Two more geese were seen to fly east over the floe later in the day. Verily, this is summer!

June 11th, Friday.—We tried a quantity of the small species of shrimp, which are daily obtained in the net, curried for dinner to-night. I cannot say that they were satisfactory, being very tasteless and all shell. They were very like wheat husks and not much larger.

Bruce, at my request, is taking a series of observations with Buchanan's hydrometer to ascertain the salinity of the sea-water here. The formula for working the results out has, unfortunately, been forgotten to be sent out, so that will have to be done at home.

June 12th, Saturday.—There is every appearance of the ice at Nightingale and De Bruyne Sounds having broken up. This has occurred much earlier than in preceding years.

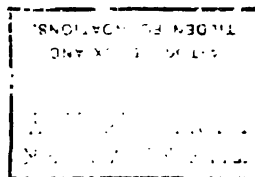
We were all weighed again this evening. Armitage has gained 11 lbs. since we returned from sledging in May, and 19 lbs. (present weight, 13 stone 4 lbs.). The others have all lost from one to two pounds each since the last weighing.

Winds E. 6, E. 5, E. 3 to 4, S.E. 3 to 4. Overcast and misty all day.

June 14th, Monday.—As the day opened sunny and clear—a great rarity—after doing my usual morning's work, Wilton and I harnessed up the team of five dogs, and taking a sledge to carry my photographic equipment, we went out to the "photographic



"I COULD SEE NONE BUT DRIFT-ICE"



HOW WE KEPT THE QUEEN'S JUBILEE

berg," where I took a series of panoramic views and several other negatives. After tea we took the dogs and sledge and went to the top of Cape Flora by the west glacier, where I took a number of bearings and tried to locate Peterhead more exactly, but without success. I took a number of negatives, but a strong wind and mist constantly coming over the summit rendered good results rather difficult. We had a fine ski-run down again, as the snow was frozen the greater part of the way, making the running fast. I brought the maximum and minimum thermometers, which I had placed up there last October, with me, as the maximum is useless, for there is nowhere up there where it is possible to keep it out of the sun, and the minimum had become disorganized.

There is a large extent of open water around Windward Island, and Gunter, Bates, Nightingale, and Miers Channels are practically open, long streaks of open water occurring at frequent intervals along their courses. There is much ice in the sea from S.S.W. through south to east, but from southwest to west there is very little, and the sea is quite open in that direction as far as the eye can reach.

Armitage gave the *Eira* boat a coating of oil and went on with the magnetic observations.

The thermometer rose to-day as high as 43.5° F.

Winds E.S.E. 2, E. 2, E.N.E. 2, N.E. 4 (increased to force 6 to 7 in the course of the evening). Sky clouded $\frac{7}{10}$ ths at 8 A.M., but cleared all but from $\frac{1}{10}$ ths to $\frac{1}{10}$ ths the rest of the day.

June 18th, Friday.—The wind had died down this morning, and as it remained sunny and the mist had cleared off the glacier, Wilton and I started off, with a sledge and five dogs to drag my camera, to ascend the high ice-dome behind the Gully Rocks, from which the east glacier derives its ice, to take negatives.

The day was clear and sunny, and the horizon in every direction quite devoid of mist, and visibility was great—most unusually so for this part of the world. I could see north as far as Cape Fisher; Scott Keltie Island, Eaton Island, the Rubini Rock, and the coast of Hooker Island stood out clearly, as also did the western shores of the British Channel. I could see the whole of the coast-line of Alexandria Land bordering up Nightingale Sound except a portion in the neighborhood of Essen Bay, which the

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high whale-back of Bruce Island covered from view. The height of the ice-dome on which I stood is about 1500 feet. We found a rather nasty crevasse on the summit covered with snow, and when descending from the dome Wilton partly got into one about five feet wide, which I had just run over on ski without discovering. The back part of his ski broke the snow bridge, and he had a narrow escape of going backward into it. These crevasses are completely concealed by snow, and there is absolutely nothing on the surface to indicate their presence. This I have found to be generally the case in Franz-Josef Land, although on certain parts of the glacier covering Hooker Island very slight depressions in



A VISITOR AT OUR HUT

the snow running along the course of the crevasses sometimes indicated their presence. This is probably caused by the frequent gales forming a quite even snow bridge over them.

I took eighteen negatives and shot four roaches. We got back to the hut at 8.30 P.M.

June 20th, Sunday.—I was awakened at 5.15 A.M. by the loud barking of the dogs. I put on a pair of boots, and a coat over my pajamas, and taking my hand-camera and rifle went out, as the barking indicated that a bear was outside. I found him close to the hut on the snow bank by the enclosure. I took ten negatives



DR. KOETTLITZ AND MR. WILTON

1890

1891

HOW WE KEPT THE QUEEN'S JUBILEE

of him at distances varying from fifteen to six yards, and having used up my films I shot him through the jaws, aiming at his head, the bullet passing backward and cutting open his throat. As the brain was uninjured he made off towards the floe, and I put a bullet into his right shoulder when near No. 3 canvas hut. This, however, did not stop him, but as he was on the point of disappearing down the steep slope on to the floe by No. 1 hut I put a third bullet into his neck at a distance of a hundred yards, which broke his backbone, and stopped all further progress. He was a good sized he-bear, with a stomach full of grass.

I turned into my blankets again for an hour or two. After breakfast we flensed the bear and cut up the meat. I took six negatives of the flensing party and the same afterwards on ski. I then developed these and the ones I had taken of the bear, all of which (three-quarter plates excepted) turned out remarkably well. The others went for a walk and amused themselves in a variety of ways, it being the Sunday holiday. A new shrimp was obtained to-day.

Winds N.N.W. 2, N.N.W. 1 to 2, N.W. 2, N.N.W. 2. Sky clouded $\frac{1}{10}$ ths to $\frac{1}{8}$ ths. Mist hanging over the high land most of the day.

June 23d, Wednesday.—Wilton began to dig out the whale-boat from the snow-drift in which she is buried. The doctor went on with the walrus heads.

Winds S.E. 1 to 2, E. 2, W. 1 to 2. Sky clouded $\frac{1}{10}$ ths to $\frac{1}{10}$ ths. Misty until afternoon, when it and the sky cleared.

June 24th, Thursday.—After breakfast Armitage and I fitted up the trawl, and then he, Wilton, and I took it and the rest of the gear on a sledge to the west point. Here Bruce joined us, and we trawled from the boat, using the dogs for towing, until after 6 P.M. Ice coming down Miers Channel bothered us a good deal. We got nothing new, and no fish, which I had hopes of doing. I shot two terns—the first seen this summer—which I am keeping as specimens.

Bruce worked at the zoology. He got a new fish, about nine inches long—a species of *gaddus*—in the trap to-day, and also a starfish (true, not a brittle-star.)

June 25th, Friday.—To-day I began photographing the sketches (biological) Bruce has made since he has been here. I then de-

A THOUSAND DAYS IN THE ARCTIC

veloped them. This is to guard against possible loss of the sketches. I am also making a collection of photographs of the birds here.

June 26th, Saturday.—I have been hard at work all day photographing the rest of Bruce's biological sketches and about half a dozen birds. Just before dinner I went for a short walk with the doctor to Sharpe's Rock. Armitage did one or two odd jobs about the place.

June 28th, Monday.—About 2 P.M. a bear was seen stalking Bruce, who was at work at the hole on the floe by the photographic berg. As Bruce did not see him at first, I started off on ski with my rifle, followed by Armitage and the doctor with rifles. On Bruce catching sight of him, "Mr. Bear" made a circuit behind some hummocks, but seeing us in pursuit, and as Bruce shouted, unfortunately, he made off towards the water's edge. Armitage and the doctor returned to the hut, as the floe is very bad walking, but I followed in the bear's tracks and might have got within shooting distance of him, but, unfortunately, Bruce again shouted to me from the top of a berg, which scared him, and he took to the water and made for an ice-piece, which he again left on my walking to the edge of the floe, and swam off towards some floating ice about a mile off. We want bear-meat badly.

On my return I went on developing negatives. Armitage is lashing up a bamboo ladder for me to get eggs off the rocks with. The doctor did several odd jobs in the house, mixed the ingredients (or rather those that we have) for a plain cake—very plain it was too, but very acceptable for all that. Wilton collected the old torn coal-sacks, and placed them on the bowlders to dry. We shall have to use them as fuel next winter if we get no more coal from the *Windward* this summer. I do hope draught-power and a few stores will come out for our push north next spring.

We have been quite out of all sugar for some time past, owing to our having to supply the *Windward* when she wintered here.

My experience confirms the view of Professor Vaughan Harley, that sugar should not be looked upon as a mere condiment, but as a most valuable food, increasing the power for muscular work. He found by experiment that 26 to 33 per cent. more work can be done when 17½ ounces are taken than by the same person when he omitted sugar from his day's food. Even the ordinary addi-



ARCTIC VEGETATION—A BED OF POPPIES

HOW WE KEPT THE QUEEN'S JUBILEE

tion of sugar to the usual full diet caused a marked increase in muscular power.

Numerous independent individuals have shown how, both in hot and cold countries, there is a natural craving for sugar when much muscular work has to be done. Professor Vaughan Harley mentions some of these in an interesting paper in the *British Medical Journal*, and Surgeon-General Sir William Moore says that the natives of India when on long journeys give their horses and camels molasses (sugar) to sustain them. Certainly, from my own experience, I felt the want of sugar considerably. The desire for sugar almost becomes a craving here.

I saw a small tringa to-day sitting near the pond by the hut, which struck me as being an uncommon species. I called Wilton out of the hut to shoot it, which he did. I am preserving it for examination by an expert. Its light color and smallness caught my eye as being different in appearance to the purple sand-pipers common here, and led to its death.*

June 29th, Tuesday.—Wilton fastened all the pups up with collars and chains to a rock behind the hut, near the older dogs. I wish to keep all the dogs carefully secured, so as to be able to quarantine any arriving by the ship, and so prevent the introduction of disease by them.

July 1st, Thursday.—It is almost three years since we left home, and only once have we heard anything of the outer world. One longs for news, and yet almost dreads it, too.

I had arranged to go out with Bruce in the *Eira* boat dredging, but ice drifted into the bay and cut us off from the water. We saw two walruses lying on a lump of ice near the west point of the bay. I started off with my rifle, and Wilton and Bruce brought on the little boat on the sledge with the team of dogs. By crossing several lanes of water and hauling the boat over

* I understand from Mr. Eagle Clarke's report that this bird is a female Bonaparte's sand-piper (*Tringa fuscicollis*). It was alone, and the only example I noticed in Franz-Josef Land; but owing to a somewhat close resemblance at a distance and on the wing to the *tringa striata*, it is possible others may have escaped observation through being mistaken for these birds. This bird is a new and remarkable addition to the series of Franz-Josef Land. I understand from Mr. Clarke that it is also the first example of this American species that has been obtained in Europe elsewhere than the British Isles.

A THOUSAND DAYS IN THE ARCTIC

pieces of ice Wilton and I got within sixty yards of them. I succeeded in killing one, and secured it in the water. We towed it behind the boat back to the slope below the flag-staff, as the ice had in the meantime sufficiently opened for us to force the boat through. Wilton spent the rest of the day in flensing it and cutting up the meat for the dogs. The second walrus disappeared at the first shot.

As the ice was too troublesome for dredging, I carried the bamboo ladder to the top of the talus with Bruce's help, and got



WALRUSES ON AN ICE-PIECE

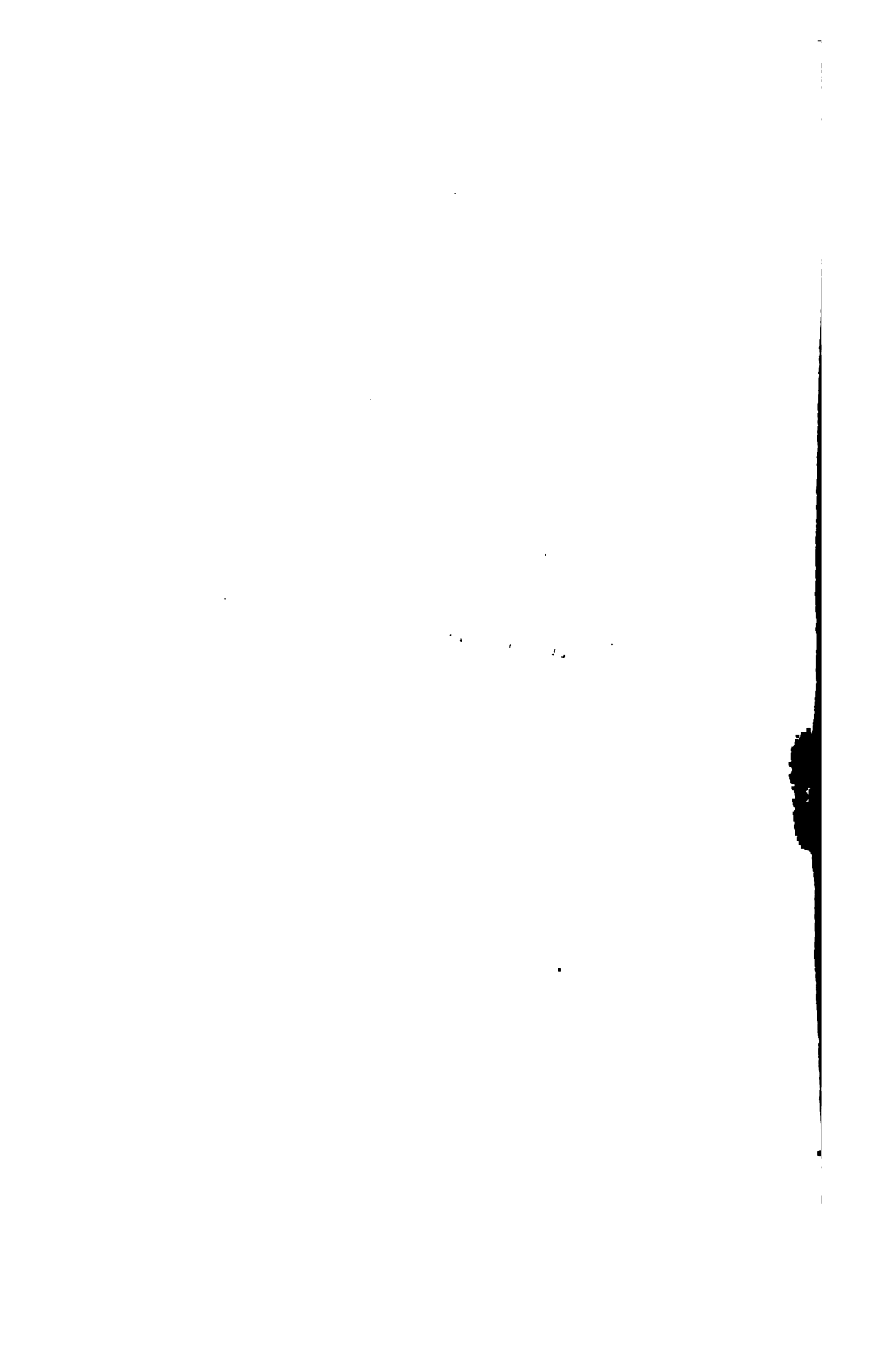
twenty-eight looms' and twelve kittiwakes' eggs. Bruce collected specimens the meanwhile of small land life. He has now three species of flies. The doctor went to the Gully Rocks geologizing. He found some black lignite *in situ* overrun by the basalt. Armitage wrote up the meteorological observations, and took an observation for time.

Winds W.N.W. 1 to 2, N.W. 0 to 1. Calm. Sky clouded $\frac{1}{4}$ th to $\frac{3}{4}$ th

July 5th, Monday.—As the day has been beautifully calm and bright, I first of all photographed my map, as a protection against loss, and then took a number of other negatives and developed them. Going outside the house after dinner with



" AFTER BREAKFAST WE FLENSED THE BEAR "



HOW WE KEPT THE QUEEN'S JUBILEE

Armitage, who had his binoculars with him, I heard a strange cry of a bird (somewhat like an ivory-gull's), and looking up into the air I saw, flying some hundred feet up between the hut and the rocks, what I believe to have been an adult Ross's gull (breast and neck a bright rosy color, becoming less marked towards the tail). I could not get a clear view of the tail, owing to the position of the bird, to ascertain if it was wedge-shaped. There were no other birds near it when first seen, but it was quite alone. The under-tips of the wings were strongly marked with a dark color. I could not see the upper surface of the bird's body or wings. We called out to the others to come out of the hut at once to look at it, but they arrived too late to see it. I went



DREDGING IN OUR WHALE-BOAT

in and got my gun, and calling Wilton to follow me with his, left Armitage to keep an eye upon it with his glasses. We ascended the talus, as he had viewed it towards the second tier of rocks, where it had flown among some kittiwakes, and although we searched for it everywhere we thought at all likely, I failed to see it again. I shall have another search to-morrow above the first rocks, as it may possibly be nesting up there. There is no record, I believe, as to what position the Ross's gull chooses for its nesting-place, as up to the present it has never been discovered.

A THOUSAND DAYS IN THE ARCTIC

July 6th, Tuesday.—After doing my work about the house, I took my gun and climbed the talus in the hope of coming across the Ross's gull. I clambered along above the first tier of rocks for some distance and searched high and low, but failed to see it. I rather think that it may be nesting near Cape Flora



F. G. JACKSON WALRUS-SHOOTING FROM HIS BIRCH-BARK CANOE

and only came here for moss—if this gull uses moss in making a nest—for last night I was inclined to believe that a bird I saw flying west with moss in its beak was the Ross's gull I had previously seen, but the distance was too great to be sure, especially as there were numbers of other birds about. I looked the rocks over closely for some hours, but without success.

I have requested Bruce to take six samples of sea-water off the shore here for analysis at home. He got a new crustacean and brittle-star to-day. Our collection of minute life will be a good one, I think. Fisher did very well, and every one has done his best to add to it.

July 7th, Wednesday.—This morning I saw through the mist a

HOW WE KEPT THE QUEEN'S JUBILEE

walrus on a piece of floating ice beyond "Bear Berg." As the *Eira* boat is away at the west point, I had to go off in my birch-bark canoe, which is a bit cranky for walrus-shooting. I paddled out about a mile, but something frightened the animal, and it slipped off into the water as I approached.

Armitage, on going out immediately after dinner, about 9 P.M., came in to say that the *Windward* was to be seen to the southwest. We saw a steamer about six miles off, but heading, to our surprise, towards Mabel Island. The fog came down thick, and when it cleared she was seen lying to about the same distance off. She has arrived earlier than I expected, but she might have got here, so far as we could see, three weeks ago, if she had started early enough.

We all went down and got out the whale-boat ready for launching, and Armitage and I went round to the west point and brought round the *Eira* boat for our use in going on board the ship.

Winds N. 1 to 2, N.W. 1 to 2, S.E. 1 to 2. Sky clouded $\frac{1}{10}$ ths to $\frac{1}{8}$ ths. Misty all day.

July 9th, Friday.—About 1.30 P.M. Armitage went along the plateau west to see if the ship was anywhere visible up Miers Channel, as her apparently strange conduct of disappearing for thirty-six hours puzzles us very much. The doctor and Bruce followed Armitage, and later on they saw the ship round the west point, and as I was told she was lowering away a boat, I also strolled down towards it, as I expected the mails to be sent ashore. To my surprise I found a strange boat on the beach, and learned that the ship, which had again disappeared up Miers Channel, was the *Balaena*, of Dundee, under the command of Captain Thomas Robertson, which had just left East Greenland, having done the passage here under steam in twelve days (eight days from south end of Spitzbergen). She had come to hunt for walruses. It seems that some one from the *Windward* in 1896 had spoken of the large number of walruses to be seen here, and of the probability of its paying to take them. I have a different opinion upon that subject. The appearance of the ship at a distance is very like the *Windward*, and we certainly expected to see no other, so we did not examine her carefully.

Captain Robertson had sent a message asking me to come on

A THOUSAND DAYS IN THE ARCTIC

board, so all of the party who had come down went off in the boat. Captain Robertson told us all the news he could prior to April: how the *Windward* had reached Vardo in six days from here last year, and the *Fram* had got home and arrived at Tromsø.



CAPTAIN ROBERTSON

so a few days after Nansen had got to Vardo, and how he met her there; about the Greco-Turkish war, and Andree's appointment in starting last year, and his proposed renewed attempt this summer in his balloon. He could not, however, give us any news of our friends. It came on to blow, with rain and dense mist, so the *Balaena* steamed up Miers Channel and anchored to the land floe off the north end of Windy Gully for protection. We were obliged to remain on board all night owing to the badness of the weather, which we were not loath to do, as nothing could exceed our host's kindness and hospitality. It was

GLACIER



MAP SHOWING SOUTHERN SIDE OF CAPE FLORA

[By R. Kottler]

HOW WE KEPT THE QUEEN'S JUBILEE

very delightful to see new faces again and hear a little news of the outside world. We slept upon the cabin floor in our clothes.

July 10th, Saturday.—The weather has much improved this morning. The engineers were engaged all day up till 3.30 P.M. in repairing the condensers, so we had to remain where we were; but that having been done, the *Balaena* steamed to the west point, and we went ashore in a whale-boat. Robertson kindly gave us a bushel of potatoes and about a peck of onions, which are very acceptable. I advised him to try Gray Bay for walruses, and he later on steamed off there to do so, intending to return to Cape Flora on Monday or Tuesday, when he will look us up. I am supplying him with a tracing of my 1896 map



THE NEST AND EGGS OF RICHARDSON'S SKUA

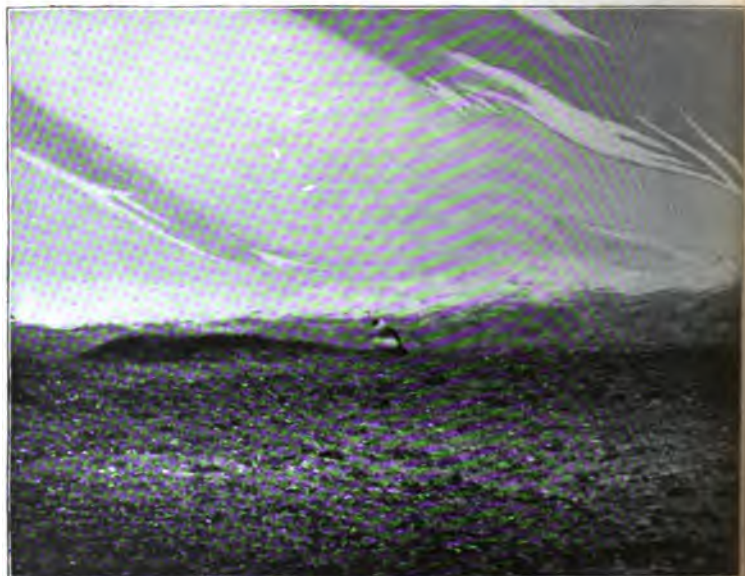
(slightly altered about Peterhead), as he speaks of going up the British Channel for walruses. He has only a small admiralty chart of these islands, which is useless to him.

His description of Franz-Josef Land strikes me as being very apt. He says: "Franz-Josef Land consists of two black spots—Cape Flora is one, and the other is something else, and you can't see both together." Meaning that, with the exception of isolated

A THOUSAND DAYS IN THE ARCTIC

black rocks at long intervals, all is a white expanse of snow and ice. He is anything but enraptured with the appearance and climate of this part of the world.

July 11th, Sunday.—Armitage and the others, after they had returned from their walk, told me they had found the Richardson's skua's nest, the vicinity of which I had marked on Friday by the behavior of the parent-birds, and which I wished to photograph.



RICHARDSON'S SKUA

it could be found. I started off west with the camera, and took several negatives of the nest with the eggs in it, and also views of the birds. After my return I developed the films.

After dinner the mist lifted somewhat, and I saw to the southward some walruses on the edge of the ice. As I wish to give all my companions each a head with good tusks, and we want some meat, we manned the *Mary Harmsworth* and started off to get them. I took several negatives of them as we pulled up, and then opened fire.

Armitage and I killed all upon the piece of ice with the exception of one, which slipped off into the water as we came up.



WALRUS ASLEEP ON A PIECE OF DRIFTING ICE

HOW WE KEPT THE QUEEN'S JUBILEE

we were taking the heads off upon the small ice-piece, a large bull walrus came up bellowing with a determined rush and clambered on the ice, evidently with the intention of "going" for us. I took my rifle out of the boat, stopping him with a bullet in the head within three yards of us, and he fell back into the water. One of the men ran to the edge of the ice and fixed a seal club in the walrus's mouth, but the walrus gave a spasmodic struggle and wrenched it out of his hand, nearly pulling him into the water. He then took off quickly, taking the seal club with him, unfortunately.



CUTTING UP A WALRUS

We towed one walrus back for dog-meat, which was the most we could manage, as we had a long way to pull back to Cape Barrow. My fellows drew lots for choice of heads when we got there. It is a pretty sight to see the cows with their cubs, holding them with their foreflippers, and sometimes swimming on their backs, carrying the little ones by clasping them with their flippers. A full-grown bull is a pugnacious beast, and, being extremely large and powerful, is apt to be dangerous. He enjoys fighting, and will go out of his way to have one. Walrusen disgorge the stones they have swallowed to aid

A THOUSAND DAYS IN THE ARCTIC

digestion, and also the shells of bivalves, and I have frequently found a small lot of pebbles and shells on the ice where walrus have been lying. There was nothing in the stomachs of those we killed to-night, and they were very much contracted probably to eject stones and shells after the digestion of the food is completed; there were small heaps of stones and shells



ONE OF OUR PETS (A YOUNG WALRUS)

near them. The doctor found a baleen of whalebone 6 ft. : in length near the west point, thirty-three feet above sea-level.

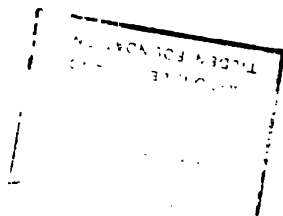
Winds E. by S. 3, E.S.E. 2, N.N.W. 0 to 1. Overcast and misty all day.

July 12th, Monday.—I spent the day in doing several odd jobs and in making a tracing of my 1896 map, altered on the west shores of the British Channel so as to be in no way misleading for Capt. Robertson, as he has no map of Franz-Josef Land the smallest use to him and has asked me for a copy.

I gave Bruce the walrus we towed in last night, as he wished



A CAMP IN SUMMER (ON THE COOKE ROCKS, AUGUST 7, 1895)



HOW WE KEPT THE QUEEN'S JUBILEE

to have it for purposes of comparative anatomy, and he and Wilton have been engaged all day in cutting the meat off the skeleton. Bruce and I examined the intestines to-night for any parasites. We found very small pieces of basalt and pieces of shell, but nothing else. The gut was over fifty feet long.

July 13th, Tuesday.—After breakfast I walked down to the skua's nest and took several negatives of the birds and brought away the eggs. Bruce went along the shore to the east with the *Eira* boat, tow-netting and dredging, and I sent Wilton to help him. The doctor went up the talus to the westward geologizing.

When I returned from the nest I saw a walrus lying on a piece of ice to the south. As I wished to get a head for Wilton and some more meat, we manned the whale-boat and, taking my camera, pulled out to it. We succeeded in killing two others, which, however, sank, and captured alive a young cub (male) by jerking him out of the water with a seal club into the boat, where he flopped and floundered about, and we had great trouble in keeping him on board. After a time he settled down and took things more easily, and made himself quite at home. We towed the she-walrus we secured ashore near No. 1 hut. I photographed the cub at the hut several times. I have lodged him in the barometer-house, and am trying to feed him on milk from a bottle. He has grown quite accustomed to us in this short time, and shows little fear. He is quite uninjured. His weight is one hundred and eighty-seven pounds—not bad for a youngster!

Armitage took the height of Cape Gertrude to-day with the theodolite, making it 1220 feet to the top of the ice dome, and the highest ridge of rocks 1057 feet. This differs somewhat from previous results.

July 17th, Saturday.—As we had got quite upsidedown so far as night and day is concerned, I determined to try and put it right by sitting up for twenty hours, and not turning in until late in the afternoon on Sunday, so as to get a fair start with the Monday.

I did a variety of odd jobs. Developed my negatives taken yesterday, and continued writing my letters to send home by the ship.

July 18th, Sunday.—The doctor and I devised a feeding-bottle for the walrus out of a football bladder, and a large tube I got

A THOUSAND DAYS IN THE ARCTIC

from him to form a nozzle. He is a very troublesome animal to feed, as he will neither suck nor drink; everything has to be forced down him, and the feeding-bottle we have made is practically a stomach-pump, which answers admirably. Robertson told us on Friday that the two they have on the *Balaena* have



ONE OF OUR PETS

had nothing at all (it is a week since they were captured), as they find it impossible to feed them. They are, however, still alive, and appear to be quite well.

Captain Robertson tells me he has seen two very small rocky islands just to the north of Cape Barents, and has asked me to include them in my map. This I have done, naming them the Robertson Islands.

CHAPTER XXXII

UNEXPECTED RETURN OF THE EXPEDITION

July 22, 1897, Thursday.—About nine o' clock this morning the mist lifted, showing the *Windward* lying a little to the south of Cape Gertrude, where she had been for some hours, but had been unable to proceed, owing to the thick weather. As she seemed inclined to approach the shore of Cape Flora on the eastern side, where the water is shallow, I sent Armitage and Wilton off in the *Eira* boat to pilot her round to the west of the flag-staff. The letters were brought on shore, when I learned the sad news of my mother's death, which had occurred just before the *Windward* sailed. I have lost the best mother that any man could be blessed with: a mother with whom self was never considered—a tender, gentle, courageous, self-sacrificing woman.

I received among our correspondence certain communications which, together with the fact that no draught animals have arrived, leave us, I fear, no option but for the expedition to return to England.

I learn also with regret that the arrangements made in London in connection with the *Windward* will also prevent my utilizing her for exploring purposes.

I had wished next spring, having completed the mapping in of these islands, to push as far north as possible by exploring to the west of Nansen's route, and the use of the *Windward* for a week or two this summer would have made the scientific results still more complete.

It is much against the grain that I leave a single item in my programme in any way not fully completed. When I undertake a work, I like to see it through to the fraction of an inch.

On receiving these letters, I called my men together and informed them of the position. As the result, I fear there is no alternative but to return.

A THOUSAND DAYS IN THE ARCTIC

Several of the crew of the *Windward* came to me to-day and applied to join my party, but under the circumstances I am unable to accept their services.

The *Windward*, under Captain Brown, made a remarkably quick passage under sail to Vardo when returning with Dr. Nansen and Lieutenant Johansen last year, being favored by strong



THE WINDWARD OFF CAPE FLORA

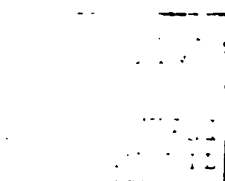
northerly winds and a sea very free from ice. They did the passage in six days.

July 23d, Friday.—To-day we have all been busy packing up our collections to be sent by the *Windward*. I have been turning the situation over in my brain all day and night to endeavor to discover some method by which I can still carry on the expedition, but can think of none.

I had a talk with Captain Brown to-day, pointing out to him



SNOW-BUNTING'S NEST ON SHARPE'S ROCK



UNEXPECTED RETURN

the advantages that may be derived, and at very little risk to the *Windward*, of steaming round Cape Mary Harmsworth, and from there northwest, to confirm my belief that Gillis Land has no existence in the spot assigned to it upon the maps. For I know how hard land dies, when once supposed to have been seen, and I wish to prove the non-existence of this much-discussed and very mysterious country beyond the doubts of even the most sceptical, although I feel quite satisfied about it as the result of last spring's sledge journey. Dredging and sounding can be carried on during the voyage, and much good work done. After satisfying every one it may interest in reference to Gillis Land, I propose that we shall steam south, and on our way home make for the islands said to have been sighted by Captains Johannesen and Andreassen in 1884 off the east coast of Spitzbergen; and should they be found "at home," to land upon them and make examinations and collections. I find Captain Brown most willing and anxious to do his utmost to help me in any way in his power, and it is due to his good nature and enterprise that I have been able to arrange with him to carry out this programme, which, however, will not take the ship far out of her homeward course.

I photographed this morning a clump of fungi upon the raised plateau of Cape Flora, which Fisher, since his return home, has reported in a letter to be "new to science," and we have gathered all we can of it, preserving the specimens in spirit. Mr. Fisher reports to me that this fungus has not been found elsewhere in Franz-Josef Land. It was discovered in two spots on this cape, the first at an altitude of about 40 feet above the sea, growing in clumps in a dry, peaty soil of dead moss, and the second a little farther west and at an altitude a few feet higher.

Nansen has very kindly sent me, as a present, a couple of canvas canoes for use in sledging. These, he tells me, were made under his own personal directions. It is very good of him to think about it, considering how busy he must be just now. He has sent to each of us a copy of his book, which is nice of him. I have, however, been too busy to glance at it yet.

July 26th, Monday.—For days I have searched for any possibility of continuing the expedition, but can find *none*; there is no help for it but to return, and having decided to do so, there is only for us to pack up with all possible speed, collect our specimens, put stores on board for our use, and get under way.

A THOUSAND DAYS IN THE ARCTIC

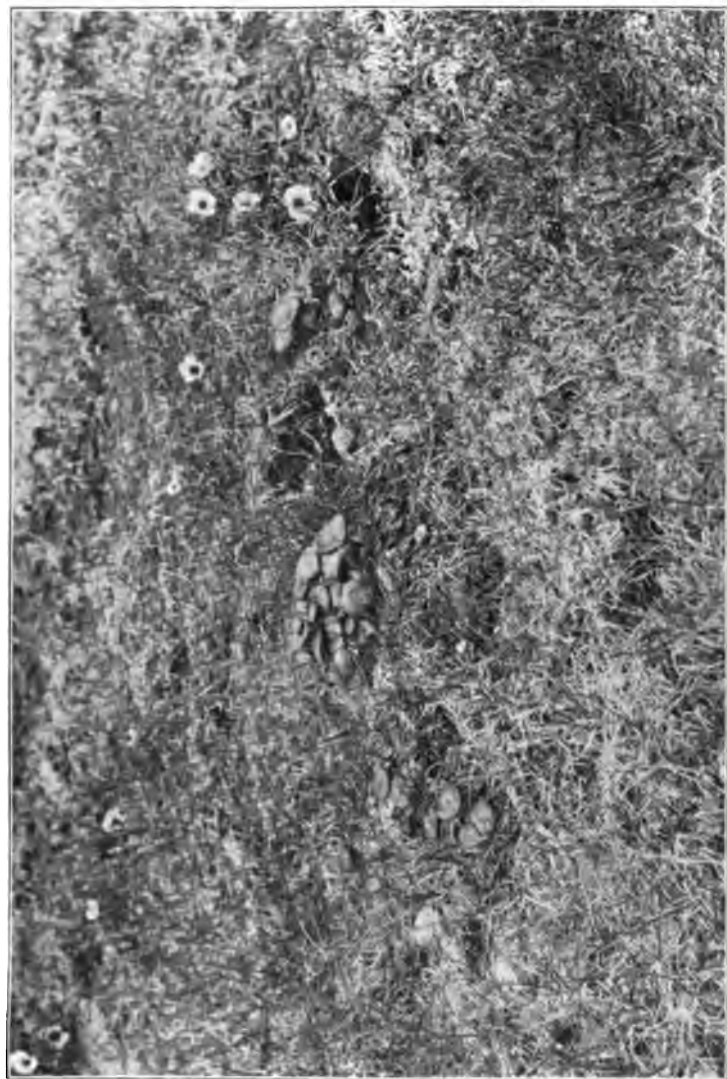
Every one has been busy getting stores on board the *Windward*, and articles are being stowed away in packing-cases at express speed as they come to hand.

This evening, when returning from the ship in a small boat, a young walrus popped up its nose alongside. In a moment I had secured a seal club in his tough little hide, and before he had realized what had happened I had jerked him out of the water and into the bottom of the boat, where I threw myself upon him and held him down to prevent him going over the side into the



THE BABY AND HIS NURSE OUT FOR A CONSTITUTIONAL

water again. He struggled, grunted, and flopped about, and it was with the greatest trouble I could retain my hold of his slippery little coat. After a time he became more reconciled to his position and his struggles relaxed. The sailor I had with me then paddled the boat to the shore, from whence it took five of us to carry him up to the hut—he weighed nearly fourteen stones—in some sacking, where we lodged him with our previous capture of that ilk, and the two now grunt in chorus in the barometer-shed. I hope to be able to get them both home to the Zoological Gardens in London. He is a trifle older—or, at all events, larger—than the first baby walrus we secured. We are feeding



TRICHOLOMA CAESPITOSUM MASSEE, N. SP. (MASSEE IN LITT.) FUNGUS, "NEW TO SCIENCE," DISCOVERED ON
CAPE FLORA

UNEXPECTED RETURN

this little chap also with the stomach-pump, as apparently, in common with his new chum, he does not understand any less advanced system of feeding, but evidently they both consider it a great improvement upon the one their mothers' adopted, as it saves them the trouble of swallowing, and they take their condensed milk now that way as a matter of course.

"Puggie," the one we captured some time ago, is now quite at home, and is a most sociable and intelligent little beast; unlike our little friends, the bear cubs, his manners have improved since he took up his residence with us, and he is now a very much respected and respectable member of our small community. Every day he is let out of his pen, and shambles about with that awkward walk peculiar to his race upon the plateau behind the hut, until his nurse, Mr. Wilton, considers that he has taken a requisite amount of exercise, when he is fed and put to bed again. He is a great pet of mine, and he, on his part, is most friendly disposed towards me.

July 27th, Tuesday.—We have been busy packing all day. Captain Brown sent three men from the *Windward* to help me this morning, and later on two more. We have now got a lot of goods on board.

I sent Wilton up the talus to shoot looms for the voyage home.

The *Diana*, which has followed the lead of the *Balaena* by coming up here, has, up to the present, only twenty-five walruses, but the latter has taken about five hundred and twenty-five in all, which, together with the whale she took in East Greenland, will pay her. Thus our expedition has been of profit, commercially, already.

August 1st, Sunday.—It blew hard from northwest the greater part of the day. A large quantity of marine life is washed up on the shore beyond the Sharpe's Rock, but having no formaline, it is impossible to preserve some of them. I photographed a jelly-fish secured to-day, which had not previously been found here, as being the next best thing to preserving it in formaline.

August 2d, Monday.—I received a very definite promise from the ships' captains that they will allow nothing to be touched at the hut after we have gone. They also said they would do their best to check any one who attempts to meddle with anything here, and would at once report any such occurrence to me.

Some unfortunate beings may be very glad of the provisions

A THOUSAND DAYS IN THE ARCTIC

we have left at the hut for any one in distress, and sooner or later, I have no doubt, they will be the salvation of some cast-away or explorers beating a retreat south. Depots of food should *never* be meddled with in the Arctic, unless there is absolute necessity for doing so. Depots of food have been robbed in the past, and deaths have been directly caused by this dastardly



FOSSIL TREE-TRUNK "IN SITU"

act. A man who helps himself to them without legitimate reason may be guilty of nothing short of murder. I am particularly anxious to protect the stores left here for possible use by Andree.

August 3d, Tuesday.—I sent the doctor, with Heyward to help him, to bring down the talus the fossil tree-trunk which the doctor had found lying under the basalt, *in situ*, about 600 feet



THE TALUS AND CLIFFS OF CAPE FLORA IN AUGUST



UNEXPECTED RETURN

By the talus, the volcanic rock had apparently overrun it, also to collect some more fossils from farther east, and to get them on board the *Windward*. Had it been my intention to now go home, I might have had some of this work done before.

I packed up a number of articles and took them off to the ship, and stowed them away. Everything is being done with the ut-



SITE OF FOSSIL TREE-TRUNK ON CAPE FLORA (INDICATED BY DR. KOETTLITZ)

most haste, and things are being pitched into packing-cases just as they come to hand.

I set Armitage to take stock of the stores we are leaving here.

Andree's friends have sent a number of goods for his use in the event of his being able to reach here; and to these goods I

A THOUSAND DAYS IN THE ARCTIC

am adding such things as I think will be useful to him, in addition to a quantity of provisions.

Andree's own stores consist of eighteen packages (including one canvas boat). Some cases have evidently been opened, possibly by the Customs in London. There is also a cask sent containing some fluid, probably paraffine.

I left in the hut for Andree, besides provisions :

One rifle and four hundred rounds of ammunition.

Two hundred 12-calibre shot ammunition (central fire).

Twelve pounds of cut tobacco in tins.

About eight gallons of whiskey.

Ten bottles of blood tabloids.

J.-H. P. E. stores left in the canvas huts :

Eighteen crates of biscuits (56 lbs. each).

One case of salt. A quantity of coal-dust.

Twelve cases of Edam cheese, damaged by frost.

Some casks of Spratt's dog-biscuits (mostly spoiled).

Twenty-two cans of boiled beef. One case of boiled mutton.

Fifteen cases of rump-steak, veal, and tripe and onions.

One case of dried vegetables. Three cases of Cadbury's cocoa.

One case of Cadbury's chocolate.

Two cases of butter (Cork and Dutch).

Eleven cases of methylated spirit. Nine drums of paraffine oil.

Four dozen fire-bricks. Two cases of tea.

Three casks of lime-juice. Some sacks of coarse salt.

Number of small union-jacks on 7-ft. bamboos.

Marks, F. J., L. J.-H. P. E.

August 3, 1897.

CHAPTER XXXIII

NO GILLIS LAND

August 6, 1897, Friday.—We have placed during the day the greater part of the cases that had been outside the hut, together with seventy gallons of methylated spirit, in the stable store, which is locked up and the door also secured with nails. All the out-buildings are nailed up and boards fastened over the windows.

Five cases, also rifle, ammunition, tobacco, butter, whiskey, a canvas boat and other articles for Andree, are placed in the hut, together with five bags of coal (the rest of the coal is left on a raised platform behind the hut, which is locked), two spars are nailed across the door, and the windows barricaded with boards. The rest of Andree's goods are nailed up in the observatory.

About 6 P.M. we left, and went on board the *Windward* in the whale-boats. The crews of the boats sang "God Save the Queen," and our jacks waved our farewell from the bows as we pulled away to the ship. I leave my work with regret.

Amid much whistle-blowing and dipping of ensigns we steamed off at 7.10 P.M., heading west. Cape Flora was quickly hidden from us by mist, thus abruptly obscuring from our sight our lonely home, for three years the scene of our varied hopes, fears, and ambitions. I feel not the smallest wish to go, with my desires not realized entirely to my satisfaction, and instead of feeling all the pleasant sensations of a school-boy returning for the holidays which we had been anticipating for three years, I experience much the reverse.

We take frequent soundings as we proceed, and the tow-net is dragged from the stern of the ship. The water is too deep for the dredge, as there is no line on board that will reach the bottom.

The wind dropped as we arrived off Bell Island and the sun came out. I remained on deck all night taking negatives of the

A THOUSAND DAYS IN THE ARCTIC

coast as we slowly steamed along. I lay down in my clothes at 4 A.M., and for two hours snatched a short sleep. As we sailed westward the sea deepened. Off the mouth of Gray Bay the lead gave 115 fathoms; a mile off the small glacier running down between the rocks on Cape Crowther, 143 fathoms.

The night was beautifully clear and still; the low midnight sun shone brilliantly in the northern sky, lighting up the cold, white, glittering glaciers of Alexandra Land. Our eyes could now fol-



WE LEAVE CAPE FLORA

low with ease, as we luxuriously steamed along, the route Am- itage and I, with our five surviving dogs, had so laboriously struggled along last spring. There to the northeast, at the head of Gray Bay, is the Peary Glacier,* up which we hauled our sledges foot by foot; and there to the northwest, at the base of the rocks of Cape Crowther, is the spot where bad weather kept us cooped up in our tent in wet clothes and rotting furs in the beginning of last May. It is difficult to believe now, with everything sunny and peaceful, that these are the same spots where all was drifting snow, bitter cold, and fiercely driving blizzard. And how we appreciate the comfort of the little cabin below,

* Named by me after the Arctic explorer, Mr. Peary, U. S. N.

NO GILLIS LAND

when we recall our camps upon that ice-bound land, when crouching over our smoky fat-lamp we swallowed our cocoa made with luke-warm water, and devoured our lumps of frozen fat bacon! Eh, and with relish too, that keen appetite alone can give. And yet I long for more sledging, and more discovery.

August 7th, Saturday.—At 6 A.M. I was called, as we were close to Cape Ludlow. Only a few scattered lumps of ice could be seen in Cambridge Bay. Away at the head of it can plainly be seen



A ROWDY-DOWDY CREW

Cape Fridtjof Nansen, which, from this point, hides Cape Johansen. I had named these capes after my brother explorers and guests of last summer. The sea is still exceedingly open, and there is practically no ice in any direction. It is a marvellously open season!

We found landing quite out of the question upon Cape Ludlow, as a glacier-face fronted the cape all round from twenty to forty feet high, as we had found it in July, 1895. So I had to content myself with photographing it instead of fixing a flag upon it and taking observations for position there, as I had intended. We then steamed on to Cape Lofley, where we found the conditions exactly the same. A sounding taken half a mile off the cape gave 175 fathoms. I photographed the cape, and we then steamed on towards Cape Mary Harmsworth. As we approached,

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a long, bare, low spit, beyond the ice-covered portion of the cape seen in 1895, opened up. It was off here we had such a bad time in July, 1895, when, driven off the coast in our whale-boat, we hung between life and death for three days, expecting every moment to be our last. The sea is smooth now, with hardly a ripple upon it, and the sky a delicate blue, with scarcely a cloud. How different to the angry, black, storm-driven clouds, thick with snow, that rushed down upon us from the north then, and the ugly, dark, white-capped breakers, lashed into fury by the gale,



CAPE CROWTHER IN SUMMER

that drenched us to the skin, and momentarily threatened to engulf us. The Arctic has an ever-changing face, and its smiling and angry moods are great contrasts.

This spit was doubtless covered deeply with snow this spring, and from the height from which we viewed it upon the high ice-clad land above, looked like sea ice. We now rounded the ice-covered portion of the cape, and went in towards the shore in deep water (fifty fathoms) to within half a mile of the low beach. A whale-boat was lowered, and we put off in it with all the collecting apparatus necessary, together with guns and food. We then scattered in various directions in pursuit of objects of scientific or other interest.

NO GILLIS LAND

Our attention was at once attracted by the large number of ivory-gulls hovering about and seated on the ground, and soon, to my great joy, the conviction was forced upon me that this must be a nesting-place of this bird. The eggs are greatly prized, owing to their rarity, and few have been collected. Admiral Sir Leopold McClintock was, I believe, the first to bring the eggs of this gull to England, and they are to be seen in the museum in Dublin. Mr. Leigh Smith found these gulls nesting on low rocks upon May Island, but, owing to the lateness of the season, he only obtained young birds.

Owing to this now being the case most of the nests were empty, but after a diligent search I found ten eggs, and Dr. Koettlitz likewise secured two. Young birds in their grayish-white downy plumage were running about in hundreds among the stones.

On approaching the nests, which we found scattered about in isolated patches or colonies over the greater portion of the spit, the parent birds became wildly excited, swooping down one after another with frantic screams within a foot or two of our heads, the whole colony joining in the attack. So daring were they that in one or two cases men were actually struck by them.

As we walked on we could see other colonies, each containing large numbers of nests, and as we left the one we had visited behind it gradually quieted down again; but as we approached the next colony the vehement cries and demonstrations were taken up by the birds there.

A number of young birds were taken on board the ship, which I hope to be able to deliver to the Zoological Society's Gardens, in London.* While engaged in collecting small marine life, in an inlet of the sea, for Mr. Bruce to preserve, I secured a jelly-fish which, by-the-by, was not small, and stung my hands and arms considerably. Mr. Bruce came running up to tell me he had found an eider-duck's nest with two young ones and an almost hatched egg. So, taking my cameras, I went round and photographed it. The nest was on a stony flat near a fresh-water pond, and consisted entirely of down, but curiously fenced in with three old pieces of drift-wood. The old bird had flown off, so I was unable to photograph her also, according to the practice

* Seven survived to reach the Thames, when six died, and the survivor I sent to Regent's Park, where it now is.

A THOUSAND DAYS IN THE ARCTIC

I have pursued of photographing both nests and parent birds when possible.

We took the ducklings on board to endeavor to rear and send them to the "Zoo."

As we walked over the low, stony, boulder-covered spit of broken-up basalt, we could see that a large extent of snow-free country lay before us, probably containing two or three square



EIDER-DUCK'S NEST ON CAPE MARY HARMSWORTH, WITH YOUNG AND EGG

miles. This was fairly level, but consisted of tiers of raised terraces or old sea-beaches, of which Dr. Koettlitz tells me there are as many as twelve. Here and there are frequent shallow, thaw-water pools.

The vegetation is scanty in the extreme, and is represented by a few lichens, mosses, a saxifrage, and a grass. Some very old whale-bones, apparently those of the *Balæna mysticetus*, lay scat-

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red about at a height of about forty feet above the present sea-level, and a portion of a walrus head containing a tusk was found at the same height.

I devoted my time especially to collecting eggs of the ivory-gull and a few young birds as specimens, and in photographing the nest, eggs, and young, and in taking general views of the nesting-ground. It occurred to me as being unusual that these gulls should here be found nesting upon the ground, whereas all previous records, I believe, refer to rocks as the spots chosen.



IVORY-GULL'S NEST AND EGGS

All nests, which are raised above the ground to an average height of six inches, had a base of from two feet to thirty inches in diameter in those I measured. They consisted entirely of moss and a few white feathers; and in two cases contained two eggs, which are exceedingly like those of the kittiwake, but larger. There was a shallow depression at the top of each nest in which the eggs were deposited. In six cases only one egg was in the nest. These I believe to be addled, but they may contain large chicks, so I am keeping the eggs unblown to be operated upon by an expert on our reaching London.

I photographed three nests with eggs; a collection of birds

A THOUSAND DAYS IN THE ARCTIC

and their nests, and a bird sitting on a nest of two eggs, which I also photographed after she had flown off. On our return to the rendezvous we had agreed upon, we put up a cairn with a jack upon a seven-foot bamboo staff, and in a bottle inclosed in a tin placed among the upper stones of the cairn I left a record.

"THE JACKSON-HARMSWORTH POLAR EXPEDITION.

"This expedition landed upon this cape—Cape Mary Harmsworth—on August 7, 1897, having left Cape Flora on the previous day in the *S. E. Windward*.

"We intend to proceed northwest in the ship to ascertain if any land exists near this cape in that direction, and then, if possible, to reach the L'Angeles Islands. All well on board.

"FREDERICK G. JACKSON,
"Commanding the Expedition."

On a piece of paper inclosed in the tin I wrote the names of those who landed.

The doctor found some small blocks of granite and some loose rock containing plant-fossils and petrified wood.

Large quantities of drift-wood (all old) and several pieces of birch-bark were found scattered over the spit, a portion of the wreck of some vessel on the north side close to the water (probably of the *Jeannette*), the vertebræ of a whale, several vertebrae, jaw-bones of apparently the *Balæna mysticetus*, and a very large upper jaw-bone of a bear. I saw a number of eider-ducks, three or four looms in the water, two or three mollymokes, two kittiwakes, and one ringed-seal. Captain Brown saw two narwhals off Cape Lofley. A number were also noticed in De Bruin Sound.

Four species of jelly-fish (two new ones), two worms, two species of shrimp (one new), buckie shells, mussels, and specimens of drift-wood and whale-bones were also obtained.

When three-quarters of a mile off Cape Mary Harmsworth the lead gave 128 fathoms, and a little farther west, off the end of the spit, 150 fathoms. The greatest depth obtained in the Barents Sea to the south of Cape Flora was 80 fathoms.

After getting on board at 7.10 P.M. we steamed away northwest in the direction of the mysterious Gillis Land.

When we had proceeded northwest eight miles in water with a little very light ice in it, a sounding gave 62 fathoms.

NO GILLIS LAND

Course northwest, sixteen miles distant from Cape Mary Harmsworth, sounding 112 fathoms.

Course northwest, twenty-five miles distant from Cape Mary Harmsworth, 234 fathoms. Brown mud.

Course northwest, distant forty miles from Cape Mary Harmsworth, sounding 290 fathoms.

The drift, noted by the swab, was easterly.

August 8th, Sunday.—At 8 A.M. took observation for longitude by chronometer. It was then clear towards north and northwest, and no signs of land could be seen from the mast-head, which I



RECORD CAIRN ON THE SPIT OF CAPE MARY HARMSWORTH. AUGUST 7, 1897

have incessantly visited. We had been steaming up a narrow bight in the ice running roughly northwest, with tight ice on either side.

Soon after 8 A.M. a thick mist came on, and about noon we came to tight ice ahead, and lay-to for some time. As we cannot proceed farther northwest, Captain Brown thinks it advisable to return to our course southeast. We have now steamed fifty miles northwest from Cape Mary Harmsworth and no land is in sight, and there are no indications of it. A sounding at this point gives 230 fathoms and a bottom of brown mud.

This I think disposes of Gillis Land, and confirms my opinion derived from our observations made this spring from the top of the glaciated land above Cape Mary Harmsworth, that this land

A THOUSAND DAYS IN THE ARCTIC

has no existence in the latitude and longitude laid down in the maps.

After proceeding southeast about eight miles the lead gave 223 fathoms; bottom, brown mud. After reaching our farthest limit northwest we went under sail when returning, but on my pointing out the importance of dredging here to Captain Brown, he unravelled the whips from his sails and, together with some small quantity of one-inch line he had on board, made it up to 300 fathoms and let down the dredge. As it had a bag of sacking attached, it refused to sink properly in the 230 fathoms of water, so Brown then stopped the ship for four hours and lowered a swab instead. A large number of starfish, a few sea-urchins and worms were the result. The mist still continued very dense. We then proceeded southeast under sail again.

Captain Brown is very unwell and is confined to his cabin.

Since writing the above I have frequently looked at the compass, and find the ship heading east of south, and on no single occasion west of south even by one degree, which is the assigned direction of the Johannesen Islands, in which direction I am informed the ice is too heavy to proceed, although I would like to sail over the supposed position of these islands. At midnight we were nevertheless out in the open sea without a lump of ice on either side of us.

August 10th, Tuesday.—This morning I learned that the ship's course had been steered through the night.

I would now like to make for King Charles Islands to the W.N.W. and get a look round from some high point upon the coast. We are at noon fifty-two miles from Northeast Point—the nearest land on the King Charles Islands.

A longitude by chronometer by Armitage at 6 P.M. (the sun being on the prime vertical and a far better observation than this morning's) gives our position at noon: Latitude, $78^{\circ} 35'$ north and longitude, $35^{\circ} 50'$ east, or about fourteen miles of latitude east of the position at noon given by this morning's longitude by chronometer observation. This makes our position at noon six or six miles from Northeast Cape on the eastern extremity of the King Charles Islands, so I feel convinced that the Johannesen and Andreassen Islands, to the east of King Charles Islands, cannot be in the position assigned to them, or we should now see

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former, as we are within a few miles of their supposed eastern coast.*

At 2 P.M. a sounding gave thirty-four fathoms, fine sand; at 6 P.M. forty-two fathoms, fine brownish sand, with black grains mixed.

By a meridian altitude I took at noon I find our latitude is $78^{\circ} 35'$ north.

August 11th, Wednesday.—Sounded at 1.35 A.M. Eighty-five fathoms; brown mud. At 11.30 A.M. took a sounding in 100 fathoms; brown mud and clay. Thick mist near the ice, with occasional showers of fine snow.

Some pomatorhine skuas were seen flying around the ship. I went off in a small boat with Armitage and Wilton and succeeded in killing one. Later on I shot eight or ten more, including two specimens of the dark variety. I also shot one Arctic tern.

A few ringed-seals are to be seen in the water and numerous bear-tracks upon the ice-pieces, but no bear has actually been seen since leaving Cape Flora.

August 12th, Thursday.—Grouse day! My thoughts turn to the moors of Scotland and pleasant days with the gun there.

This morning we pushed for some hours through tight patches of ice with looser ice between, but whenever we tried west we met with tight ice. Captain Brown, who was on the bridge all night, finally turned the ship's head homeward, and we soon got entirely outside the floes. We could, however, have pushed in westward when we were farther north had it been attempted.

I continued developing negatives.

At noon a sounding gave 65 fathoms; bottom, brown mud; latitude, $77^{\circ} 5'$ N.

At 2 P.M., 64 fathoms; rock.

At 8 P.M., 58 fathoms; fine sand.

It has been overcast, somewhat damp, and a "Scotch mist" throughout the day.

At 10 P.M. the lead was lost from the sounding-line. We kept outside the ice all day, steering a course for Hope Island, south up to 4 P.M., and then southwest and west.

* Mr. Arnold Pike has since landed upon the King Charles Islands, and has confirmed my opinion that the Andreassen and Johannesen Islands have no existence in fact.

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August 14th, Saturday.—The *Windward*, under the best circumstances, will steam three and a half to four knots; only fifteen pounds of steam, instead of twenty-five, is now allowed since the breakdown off Hammerfest on the way to Franz-Josef Land this summer.

At noon soundings gave 42 fathoms; fine sand and green mud.

At 4 P.M., 27 fathoms; small basaltic stones and broken shells. 6 P.M., 17 fathoms; small stones and broken shells. 8 P.M., 12 fathoms; small stones. 10 P.M., 34 fathoms; small stones and shells. Midnight., 64 fathoms; fine sand.

Various courses: tacking to a S.S.W. fresh breeze under steam and sail; frequently "breaking-off"; making for Bear Island. Sea rather rough.

August 15th, Sunday.—At 2 A.M., 42 fathoms; sand and shells. 4 A.M., 31 fathoms; sand and shell. 6 A.M., 23 fathoms; sand and shell. 8 A.M., 25 fathoms; gravel. 2 P.M., 32 fathoms; shells. 4 P.M., 29 fathoms; shells and small stones. 6 P.M., 27 fathoms; sand, shells, stones, and coral. 8 P.M., 27 fathoms; coral, shells, and small stones. 10 P.M., 34 fathoms; coral, shells, and small stones.

Strong southwest breeze. High sea. Overcast and generally misty. Tacking off Bear Island, which the thick weather prevents us from seeing.

August 16th, Monday.—This morning the weather cleared, showing Bear Island (southeast extreme, high and rocky) bearing west about twenty-three miles. The wind was westerly and steady. Captain Brown made a course for London, as he could not beat up against a head-wind towards it.

Mount Misery (on northeast end of Bear Island) is marked on the charts as being 1200 feet high, and appears to be a rounded off hill ending in a peak at the summit. The low land between it and the perpendicular rocks at the southeast extreme of the island gives the appearance at a distance of two small islands.

I tried my camera upon it. Printed from the negatives recently taken, and toned and fixed a number of positives.

The air now feels delightfully balmy and warm. We are feeling the effect of the Gulf Stream. The barometer keeps about 50° F., which seems tropical to us.

August 23d, Monday.—At about 10 A.M. the boiler again gave serious trouble. The wind had died away, and Captain Brown

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had begun to steam against the head-sea. There was a pressure of only ten pounds of steam at the time.

August 25th, Wednesday.—This morning we sighted the coast of Norway, in the neighborhood of Breed Sund. About noon we passed several fishing-smacks, and obtained a few ling and cod from one, but they were only just out and had not caught many. We lowered a boat on steaming close up to another, and tried to get more, but they were only just out from Bergen and were then setting their lines. We had had no fresh fish for more than three years. How we relish it!

The crew came back with some wonderful story about some English yachtsman having shot a pigeon from Andree, with a note stating that he (Andree) had crossed the 80° with a fair wind. He is on a most risky journey—the most so of any that has ever been attempted. He exhibits great pluck, and I wish him every success in his brave venture.

It is cheerful to see life and signs of a civilized world again. I noticed one black-headed gull this evening—the first I have observed. Hitherto I have seen only mollymokes, puffins, kittiwakes, and an odd skua.

August 28th, Saturday.—This morning we passed through quite a fleet of fishing-boats from Peterhead, and got a few herrings from one of them, which were thrown on board, as there was too much sea to lower a boat, and they were asked to report us at Peterhead. A head-wind is still bothering us, chiefly from the S.S.W., and the sea is still high. We made short tacks in and off shore, and towards night took in sail and went under steam, as we had got to some extent under cover of the headland to the south of Aberdeen. We ran up the ship's number, "T.H.P.Q." when off Buchanness.

We passed Aberdeen about 9 P.M., and kept on, under steam, about two miles from shore to take advantage of the tide running south for a longer time in-shore.

It is pleasant to see trees and green fields again, with all the evidences of life and the great world, after the lonely life we have spent for over three years in the dead, white land of the north.

September 1st, Wednesday.—Saint Partridge day!

Captain Brown had the crow's-nest down early this morning. At 3 A.M. the wind headed us again. We passed Yarmouth about 7 A.M.

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When between Lowestoft and Southwold we sighted pilot-boat No. 5, and Captain Elvin, the pilot, came on board and took the ship in hand.

The head-wind increased in force to a gale, and in the shallow water here, where no soundings show over twenty-eight fathoms, it soon put up a sea, stopping our headway. After 2 P.M., when the tide set against us, we actually went astern, although under steam and fore-and-aft sails. Towards night the wind increased to a fresh gale, and we remained in much the same spot as we had been in the morning.

September 2d, Thursday.—By midnight the wind had increased to a strong gale, with the force of a whole gale in the squalls. The binnacle and side lights were frequently blown out, the main-top-gallant-staysail carried away and was torn to ribbons, and soon after one after another of the fore-and-aft sails followed suit, through the sheets parting. The result was that as the ship has insufficient engine-power, and was now carrying no sails, her head could not be brought up to the wind, and she lay quite out of control in the trough of the sea, with the waves breaking over her.

The pilot frequently came down to look at the cabin compass, and about midnight, as the binnacle-lights had again been blown out, was much concerned, remarking that things looked "very unpleasant, and that it would be mere good-luck if we kept clear of other craft, as the ship was quite out of control, her steam-power being entirely useless to stand against the gale."

The dogs were having a bad time on deck, and their melancholy howls would occasionally rise above the roar of the wind. "Gladys" and "Miss Råwing" were so frightened that they would not stay in their kennels, but left their pups and joined in the general chorus, as the roll of the ship or seas coming over sent them splashing into the lee-scuppers. I went up and tried to help them, but came to the conclusion that they were better loose than tied up.

Below, things were flying about in all directions, and the gear in my cabin was in a hopeless mix-up—guns, boots, sponge, tooth-brushes, soap, and water-jug mingled with my "go-ashore" clothes, being in a lovely muddle on the floor.

In the pantry a frequent crash of crockery indicated anything but a peaceful condition of things there. I lay part of the time

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on the couch in the little saloon, and by wedging myself in against the table rendered myself less movable, and tried to get to sleep; but a volley of charts from the rack above, followed almost immediately by an erratic bottle of whiskey and a tin of tobacco on the back of my head, which had taken legs on their own account and which I had endeavored to secure in a safe position, soon roused me up, and placed sleep quite out of the question.

Things went on in this manner throughout the night without improvement, and the pilot felt very uncomfortable, owing to the uncontrollable condition of the vessel. He, however, amusingly took salve to his soul by saying he should charge for her as a sailing vessel, as she is only a steamer in name. The poor old *Windward*, I regret, got shockingly abused.

The gale still continued all morning. We are now abreast of Southwold, and with the flood-tide can hold our own, but go to leeward directly it changes. Towards night the wind died down, the shallow sea here rapidly followed suit, and we began to forge ahead with a little speed; the pilot tells me that to-morrow morning we shall be in the Thames if things go well.

CHAPTER XXXIV

HOME AGAIN !

September 3, 1897, Friday.—Here we are in the Thames again, after more than three years absence and isolation from the world. How the thoughts return to that 12th of July when we stood upon the deck of the *Windward*, and said "good-bye" to friends and relatives (some of whom we then saw for the last time) who had come to wish God-speed to the little band of adventurers ere they drew aside the veil that separates the busy world from that land of mystery, that great unknown tract of the far north, where the foot of man had never trod, where the sun of knowledge had never shone. Are we quite forgotten by those who remain? Are they satisfied with our achievements, and will they be at Greenwich or Greenwich to welcome us? These are the thoughts which crowd through our brains as we crane our necks over the side of the vessel to make out the details of the well-known banks. Yes! there is Dr. William Neale, an Arctic man himself, whose genial face we all know so well, and my brother, too, coming alongside as we slowly weave our way through the river-craft. How hearty are their congratulations and welcomes, and how we bombard them with questions as to the well-being of this person and that, and the events that have occurred during our years of absence! Some well-loved faces are not there, which would have been the first to welcome and grasp our hands had the relentless grip of death spared them !

A return home after a long and almost newsless absence is always tinged with sorrow, but certainly the many hearty welcomes and the kindness of our friends do much to banish thoughts of sadness from our minds.

Soon we are ashore with our personal baggage, which the courteous Custom officials pass with as little trouble as possible consistent with their duty, and a short train-journey lands us

HOME AGAIN!

in the midst of London life once more. The expedition is at an end!

How strange it feels to get into a frock-coat and under a tall hat, and how uncomfortable a starched collar! The noise of the streets is quite nerve-jarring, and the weather, which our friends laughingly assure us is but pleasantly warm, to us assumes tropical heat, as we wipe our perspiring foreheads and almost wish for a whiff of the chilly airs of Franz-Josef Land to cool us.

Rapidly, however, these new sensations wear off, and we are hailing hansoms, dropping in and out of clubs, criticizing *menus* like the most orthodox men-about-town, and by the discerning manner in which we decide upon the merits of this *entrée*, or that savory, no one would imagine that the same men only a short time ago were swallowing with vast gusto large lumps of fat bacon or junks of semi-cooked and leathery bear-meat.

After our anxieties had been set at rest with regard to our friends, I fear our stomachs took precedence in our thoughts. How we enjoyed bottled beer and roast beef, two things we had always longed for in Franz-Josef Land, and the satisfaction of coming face to face with the latter is amusingly illustrated by a telegram I received when seated at dinner on the night of our return, signed by my late comrades, who were dining together at a Piccadilly restaurant. It ran: "Isn't roast beef good?" followed by their names.

For three years we had been quite exempt from colds in the head, owing to the fact that germs are unable to exist, unless under exceptionally favorable circumstances, in the Arctic. No sooner, however, did we return home than most of my late companions were immediately affected by it, and running noses and streaming eyes at once came in fashion.

Hundreds of telegrams of congratulation poured in upon me, as leader of the expedition, from all parts of the world; but what I value most are the letters I received expressing approval of the work we have been able to accomplish, and of my conduct of the expedition, from men whom I may be permitted to describe as the "Old Guard of the Arctic," who in times past have so gallantly upheld British prestige in the polar area—men who *know* the hardships and privations to be endured, the dangers to be passed through, and the difficulties to be surmounted; in

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a word, *men who know the Arctic*. From such men as Admiral Sir Leopold McClintock, Admiral Sir George Nares, Sir Clements Markham, Admiral Sir Erasmus Ommanney, Admiral Albert Markham, Admiral Sir Vesey Hamilton, Captain Sir Allan Young, Mr. Leigh Smith, Dr. William Neale, and many others, I appreciate and value the honor of obtaining congratulation and approval, to obtain which is to me ample satisfaction for my labors.

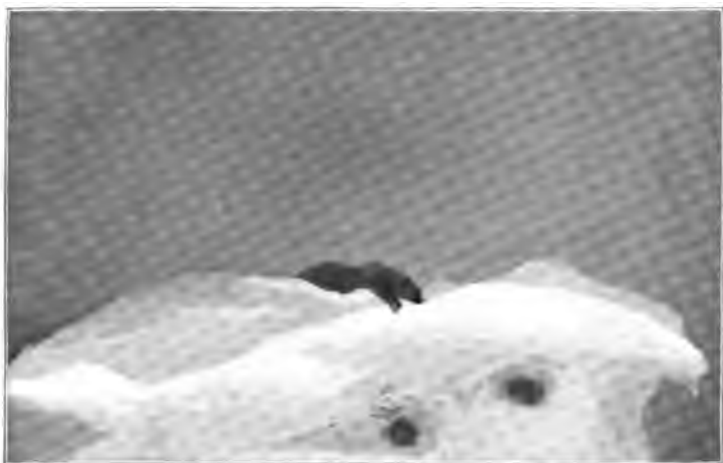
I cannot close this attempted account of the expedition without offering my warmest testimony to my fellow-workers and comrades in Franz-Josef Land, to whose loyal support and assistance any success we may have attained is due. They worked hard and conscientiously to obtain the best results possible. They were ever busy; seldom was there idle time on anybody's hands, and I may say that their loyalty and industry have been crowned with success. I have not attempted in this account to do more than touch upon the scientific work of the expedition, which would more than fill the two covers in itself, but when this work is published, those interested will be able to judge of the amount of hard work expended by each and every member of the party. Work and constant occupation, combined with our doctor's good care of us, largely contributed to keep us in the good health we all enjoyed,* and made every one happy and contented, for I can say without the least hesitation that no happier or more contented little party ever existed in northern latitudes. We were always busy, and to a great extent I believe that is the secret of our health and happiness; I say to a great extent, for our doctor's—Mr. Koettlitz—conscientious and thoughtful precautions to insure our health must not be forgotten in connection with this matter. It is a true saying that prevention is better than cure, and if his medical office did prove somewhat of a sinecure, so far as human beings were concerned, he directed his energy to doctoring juvenile bears, baby walruses, dogs, and ponies. The Arctic has proved very fatal in the past, and will in the future unless every precaution is taken to insure health and well-being. His excellent geological work, together with his careful labelling of specimens—one of the most

* None of us had a day's illness throughout the three years we were away.

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important points in collecting—has obtained the praise of higher authorities than myself upon this matter.

To the energy and industry of Mr. Armitage is due the carefully recorded meteorological, astronomical, and magnetic observations extending over three years, and he, in common with all members of the party, lent every assistance to the advancement of each branch of science coming under our notice, for each man helped the other to the utmost of his ability. To Mr. Armitage's loyal aid I wish to offer testimony. We have been



TREED

through rough times and many dangers and hardships together, and I know the good material of which he is made. It is invidious, however, to particularize, for one and all did their best.

To Mr. Alfred Harmsworth I tender my hearty thanks for the all-important part he played in contributing the necessary funds for fitting out and maintaining the expedition, the total cost of which, owing to his objection, I am unable to state. I think it is due to him that I here contradict the suggestion, which I understand was made during my sojourn in Franz-Josef Land, to the effect that the expedition was organized by us for any other than purely scientific purposes, such statement being absolutely without any foundation, and contrary to fact; moreover, I desire to

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add, in connection with such statement, that I personally have received no pecuniary benefit whatever.

The plans of the expedition are embodied in the following letter, which was written on the eve of my departure by Mr. Harmsworth to Mr. Arthur Montefiore, and published in the public press :

" 12 CLARGES STREET, PICCADILLY.

" MY DEAR MONTEFIORE, — To write 'a few words' on a subject one has at heart very deeply is not easy; but I will be as brief as possible in my explanation of the reasons I had in mind when I decided on fitting out the present polar expedition.

" From the time when, as a youngster, I read the story of Franklin I have always been fascinated by the great mystery of the north. Julius von Payer's book, and the concluding chapter of Admiral Markham's 'Sir John Franklin,' decided me to contribute to the best of my ability to the exploration of Franz-Josef Land, in itself a field for a vast amount of scientific work, and, in the opinion of many of the most distinguished Arctic men, the best road to the north pole. Having, owing to the efforts of yourself, been made aware of Mr. Jackson's wonderful energy and his recent work in the Arctic, I offered him the leadership of the expedition, and secured an ally in whom I place the utmost confidence.

" As to Mr. Jackson's chances of reaching the pole, I shall say nothing. For my own part, I shall be entirely satisfied if he and his companions add to our knowledge of the geography and the fauna and flora of Franz-Josef Land, and the area lying immediately north of it. With 'beating the record' north I have very little sympathy. If Mr. Jackson plants the Union Flag nearer the pole than the Stars and Stripes (who head us by four miles only) I shall be glad, but if he came back having found the pole but minus the work of the scientists, of which our expedition consists, I should regard the venture as a failure.

" I have emphasized this point particularly. Our venture is not a north pole, but a polar expedition — a distinction with a vast difference. The advice and assistance given us by such authorities as the President of the Royal Geographical Society, the Council of the Meteorological Office, the Committee and Superintendent of the Kew Observatory, Captain Cook, R.N., of the Hydrographic Department of the Admiralty, Mr. B. Leigh Smith, Sir Leopold McClintock, Admiral Markham, Sir Allen Young, Mr. R. H. Scott, F.R.S., Mr. J. Coles, F.R.A.S., of the Royal Geographical Society, Mr. W. Harkness, F.C.S., of Somerset House, Sir George Thomas, Bart., and Dr. W. H. Neale, and the interest evoked throughout the world, have been very gratifying to all the brave fellows who have elected to be left on Franz-Josef Land for two—perhaps for four or five years.

" Yours faithfully,

" ALFRED C. HARMSWORTH."

HOME AGAIN!

I think I may say, without boasting, that the expectations and desires expressed in this letter have been fully realized.

My warmest thanks are also due, for assistance and advice, to the President and Council of the Royal Society, the President and Council of the Royal Geographical Society, the Council of the Meteorological Office, the Committee and Superintendent of the Kew Observatory, the President and Council of the Geological Society, the President and Council of the Tyneside Geographical Society, Captain Creak, R.N., Admiral Sir F. Leopold McClintock, Admiral Albert H. Markham, Mr. B. Leigh Smith, Dr. W. H. Neale, Admiral Sir Erasmus Ommanney, Mr. J. E. Harting, the late Dr. George Harley, Captain Sir Allen Young, Professor Vaughan Harley, Mr. D. Lewis-Poole, Mr. B. Daydon Jackson, Mr. R. H. Scott, Mr. Strachan, Sir Archibald Geikie, Messrs. E. T. Newton and J. J. H. Teall, Dr. Bowdler Sharpe, Mr. Eagle Clarke, Mr. F. W. Frohawk, Mr. Edgar Farman, Sir George Thomas, Bart., Mr. W. A. Bromwich, Mr. Frank Bromwich, Mr. W. Harkness, late of Somerset House; Dr. Chree and Mr. Baker, of Kew Observatory; Mr. G. E. T. Smithson, Mr. Arthur Jackson, Mr. Morris Colles, Mr. Alexander Nansen, Mr. Henry Cooke, and Mr. J. Jeffreson.

Mr. A. Montefiore must also be remembered for his hard and enthusiastic work in assisting in the organization of the expedition.



CHAPTER XXXV

CONCERNING SCURVY

ALL travellers in the Arctic are interested in the grave question of scurvy, which has played such havoc in the past, not only among Arctic expeditions, which perhaps have suffered most severely, but until recent years also in our merchant-service and navy, in which even now cases happen. Credit has been given to the use of lime-juice in these two services for the great reduction of scurvy on board ship—unfairly, it seems to me—for before we accept the theory that lime-juice acts as a preventive of, or even as a curative agent in scurvy, it would be well to ascertain in what way it acts upon the economy of the body, which question up to the present has remained unanswered; consequently its use can only be classified as empirical, and not founded on reason.

Before giving lime-juice the credit of practically sweeping away scurvy from the mercantile and royal navies, it should be remembered that other causes have been at work to promote health—such as improved sanitation, shorter voyages through the increase of steam-power, and especially *better food*. For many years I have studied the question of scurvy, not only from records, but in countries where it is still rife, and the following are some suggestive facts I have collected: On the Nares' Expedition the crews of both the *Alert* and *Discovery* suffered greatly from this malady, although lime-juice was daily taken by all hands when on board. A little only was taken when sledging, in accordance with the practice then adopted on all such journeys. Yet I hardly think the warmest advocate of lime-juice nowadays would go so far as to say that the outbreak of scurvy, when sledging for a few weeks, was caused alone by its omission. Thus we have an instance of lime-juice taken daily, with the exception of a few weeks when sledging, and scurvy is rife among the crews of both ships. On the other hand, Mr. Leigh Smith's party, with its

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medical officer, Dr. W. H. Neale, after the loss of the *Eira*, spent nine months, including a winter, upon Franz-Josef Land, under very rough circumstances, and *without* lime-juice. They, however, lived upon newly killed fresh meat, and no case of scurvy occurred among them. When living among the Samoyads, upon Waigatz and the Bolshaia Zemelskija Tundra of north-east Russia, some striking facts came under my notice indicating the cause of scurvy.

Among the Samoyads, who yearly winter upon Waigatz, and never take vegetables or even know what lime-juice is, scurvy is unknown. They, however, live upon fresh reindeer-meat.

On the other hand, scurvy is common among those Samoyads who go south to the Petchora River with the Russian peasant traders in the autumn, and live in common with them in the districts adjoining the large rivers upon salted fish until the following May. This salted fish I can testify from personal experience is invariably very imperfectly cured. In fact, both the Samoyads and peasants prefer it "high." Scurvy is also common among the peasants, who live upon this food. When at Kharbarova, a Samoyad village on the Yugor Straits, in 1893, a striking case came under my notice indicative of the cause of scurvy. Six Russian priests, whose religion forbids them to eat meat but allows salted fish, were left at the village in a hut put up for their use by Siberiakoff, the Siberian millionaire, to spend the winter, a year or so before I arrived there. A little Russian boy, whom I have seen and conversed with, was left to wait upon them. The six priests lived almost exclusively upon tea, bread, and salt fish. The boy had similar food, excepting that, instead of salt fish, he ate fresh reindeer-meat. None of them had any vegetables.

In the following spring, when the Russian traders returned, they found that all the six priests had died of scurvy; whereas the little boy, who had lived on fresh meat, and had not partaken of the fish, was alive and quite well, and had buried all his late masters in the snow. He was the only living being in Kharbarova when the Samoyads and Russians returned. The graves of the six priests I have myself seen. These facts were related to me by reliable witnesses when at Kharbarova. They indicate, I think, that the trouble lay in the imperfectly cured fish.

From these and the following facts I have come to the con-

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clusion that the use of lime-juice neither prevents nor cures scurvy. I entirely agree with the views of Professor Torup, and believe that scurvy is a disease developed through eating tainted food—that, in fact, it is a slow poisoning of the system through the absorption of the products of decomposition, known to chemists as “ptomaines.”

Looking now at our own experiences during our stay in Franz-Josef Land in the light of these theories, we have on one hand the crew of the *Windward* of 1894 to 1895, which wintered there, taking their ounce of lime-juice with the greatest regularity daily, and yet scurvy broke out, causing at least one death directly attributable to it, and numerous other cases occurred on board. Lime-juice also gave no beneficial results when administered to the sick men. There was a supply of fresh potatoes on board, in addition to a quantity of desiccated vegetables. On the other hand, my own party ashore practically took no lime-juice, as only two or three drank it as a refreshing drink for the first few months, after which none was used. I personally did not take it at all. None of us had a symptom of scurvy, although we lived there for three years. We used only desiccated vegetables, which are supposed, according to Dr. C. H. Fagge, to have no anti-scurbutic value, some tinned tomatoes, and during the second winter a little frozen scurvy-grass. In the case of the crew of the *Windward*, I fear that there was considerable carelessness in the use of tinned meats that were not free from taint, although tins quite “gone” were rejected; and even some of the sick men contrived to obtain the salted meat,* which I had locked up, with orders that it should not be served out, when the first case of scurvy occurred. I have always suspected it of being the great cause of scurvy in the past, as, in my opinion, it always contains ptomaines for it is never perfectly cured.

With regard to my own party, which was under my immediate supervision, either Dr. Koettlitz or I *always* saw that all tinned or other meat used was perfectly good and wholesome before any one partook of it, and I would not allow a single tin to be eaten until it had passed our censorship. We largely used fresh bear-meat, and the crew of the *Windward* were also allowed as much

* This I did not hear of until months after the ship had left Franz-Josef Land.

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as they could be induced to eat. They, however, preferred tinned meat several days a week to a diet of bear-meat alone ; and some of the crew had such a prejudice against bear-meat as to refuse to eat it at all.

Confirming these views and the experiments made on monkeys presently related, Dr. George M. Robertson, of the Perth District Asylum, relates to me the case of a woman who had been sent there as a patient, chiefly owing to her affliction taking the form of eating all manner of filth from pigs' troughs, which would contain ptomaines. This woman arrived at the asylum suffering from spongy, ulcerated gums and other indications of incipient scurvy—in fact, from what is sometimes called “land-scurvy”—and ultimately all her teeth, except the canines, fell out. Professor Vaughan Harley, in his pamphlet upon sugar as a food, mentions the case of a ship leaving the West Indies, and soon after the voyage began scurvy broke out. In course of time their provisions failed them, and they were forced to make use of their cargo of sugar to live upon, with the result that the scurvy ceased. It appears to me probably what happened was this : In all likelihood their provisions largely consisted of imperfectly cured meat, which, on being finished, the ptomaine poison contained in it was finished also, and the scurvy died a natural death, allowing the men to recover. The sugar, in itself a wholesome and good food, merely kept the men alive by its nourishing qualities, but had no specific curative effect upon the scurvy.

Prevention is better than cure in the case of scurvy, as in all other evils to which man is heir. The prevention in this case I believe to be the use of fresh, or, at all events, untainted food, or, in other words, food free from the poison of ptomaines. But once contracted, the fundamental principle to be kept in view is the prevention of the continuance of this poisoning process, which, if continued, must end fatally, by the substitution of any kind of fresh food, not necessarily vegetables.

On returning to England, in September, 1897, in the course of conversation I communicated my ideas as to the cause of scurvy to my friend, Professor Vaughan Harley, and at his suggestion I called upon Lord Lister and Professor M. Foster, and explained my views to them, applying through them to the Royal Society for a grant to enable me to carry on experiments upon living animals by feeding them with tainted tinned meat, Professor

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Harley promising to conduct the experiments at his laboratory at University College.

The Royal Society has honored me by giving me this grant, and the experiments have been begun, with what results I will now leave to Professor Vaughan Harley, my colleague in this matter, to relate.

AN EXPERIMENTAL INQUIRY INTO SCURVY

By VAUGHAN HARLEY, M.D.,

Professor of Pathological Chemistry, University College, London

The cause of scurvy was until recently considered to be the want of fresh vegetables, but Mr. Frederick Jackson collected facts, both from his own personal experience and the result of investigating the records in connection with scurvy, which led him to agree with the opinions of Professor Torup. Professor Torup considered it due to eating meat which had not been properly preserved—in fact, scurvy to be a ptomaine-poisoning. If meat is not properly preserved micro-organisms contaminate it, and as a consequence it goes *bad*—the bacteria chemically change the albumen, fat, and carbohydrates in the meat, and the new chemical products formed (ptomaines) cause the change in color, smell, and other alterations which we designate as putrid meat. As a matter of fact, science has shown that preserving food really is to keep it free from micro-organisms, and so long as this is properly done the food will not go bad. At the same time, before the meat has actually gone so bad as to be repugnant to the sense of smell and sight, bacteria may have done their work, and yielded their ptomaines. Such meat is called *tainted* for the purpose of description. It is such *tainted* meat, and not bad meat, that one must look to as the cause of scurvy. In fact, the greater prevalence of scurvy in the winter than the summer—which used to be argued in favor of the fresh vegetable theory of the disease—is in support of this ptomaine theory; for in summer, if meat is kept, the bacteria would proliferate with such rapidity that the meat would soon smell bad and be rejected. In winter it would not taint so rapidly, and might be cooked and eaten without thought of danger. It must be remembered that although cooking will destroy bac-



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teria, the ordinary heat so used would have no action on their chemical products, or ptomaines. Again, if the meat were putrid, eating it would cause acute ptomaine-poisoning, with headache, violent diarrhœa, sickness, etc., within a few hours ; while if only slightly tainted meat were taken, the dose of the ptomaine with each meal would be so small as to cause no immediate symptoms, and the disease would gradually develop itself, as we know scurvy does. In conversing with Mr. Jackson on this subject, I suggested that before we accept the "ptomaine theory" of scurvy, it would be well to see if it was possible, experimentally, to reproduce the symptoms of scurvy, or anything like it, by feeding animals with ptomaines ; and for this purpose I suggested he should apply to the Royal Society for a grant towards the expenses of such a research. Mr. Jackson laid his facts before Lord Lister and Professor Michael Foster, and as a result received the required grant, and I undertook to conduct the experiments in my laboratory at University College, London.

Our method of experimenting, and the results so far obtained, can be briefly summarized.

Monkeys were employed, as they were the nearest approach to man that could be used in such a research. The animals were fed on a diet of boiled rice and dry maize, and, as to warmth, light, and air, all were treated the same. Unfortunately the monkeys used had to be freshly imported ones, and hence in the process of acclimatization some died from diarrhœa. Rice is considered to have no anti-scorbutic properties, and the same may be said for maize, so that the staple diet contained nothing equal to the fresh-vegetable diet ordinarily employed. Finding they took this diet well, the rice was boiled daily with meat, and one series of monkeys was fed on good meat ; the other series was given meat which had stood in the laboratory exposed for some two or more days until it was slightly tainted, although it had no bad smell. We thus had two sets of monkeys under the same conditions, but one series, in addition to their rice and maize, had good meat, and the other tainted meat. They were then watched from day to day and their weight taken. It was found in the case of the monkeys fed with tainted meat that in from nine days to a month they began to show symptoms—*i.e.*, as a rule, diarrhœa tinged with blood was first noticed, and soon after the gums were found spongy, easily bleeding when touched,

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and with this there were marked wasting and general feebleness, but no tenderness of the limbs and no discoloration of the skin as found to occur in man affected with scurvy. In the case of the monkeys fed on the good meat, although they had in some cases diarrhœa and there was loss of flesh, in no case, even after the diet had been continued, were there any spongy gums, and only once blood in the motions. That these monkeys should



HIS FIRST AND LAST RIDE

lose some weight is not to be wondered at, considering that the diet used can hardly be considered the best for freshly imported monkeys that had not been sufficiently long in England to stand the climate well. These experiments are naturally only in a preliminary stage, but the results so far obtained show that by feeding with tainted meat one obtains a condition much resembling scurvy, if not scurvy itself. At the same time the experiments do not quite negative the fresh-vegetable theory as being one of the preventions. No scientific investigation on the subject of scurvy has been prosecuted since the discoveries of Pasteur have shown us the havoc produced by bacteria as a cause of disease. Therefore, with this new scientific light to guide us even in such a difficult problem as scurvy, there is every prob-

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bility of a successful issue. At the same time we must remember that the disease described as scurvy in the various circumstances in which it has been met in the past does not seem to be one pathological entity. The research will be continued in order to try and investigate the fresh-vegetable theory of prevention, as it is of the utmost value to mankind that such a question should be settled.





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APPENDIX

NOTES AND DESCRIPTIONS OF THE EGGS COLLECTED BY
FREDERICK G. JACKSON AND THE JACKSON-HARMS-
WORTH POLAR EXPEDITION IN FRANZ-JOSEF LAND,
1894 TO 1897. BY F. W. FROHAWK, M.B.O.U., F.E.S.

SNOW-BUNTING (*Plectrophenax nivalis*).—A nest and five eggs (original-ly six) found at Cape Flora June 22, 1895; a compactly constructed nest, composed externally of various grasses, fibres, and roots, lined with wool and hair of polar-bear and an abundance of feathers; all, with the excep-tion of two or three, are white. Four of the eggs average $\frac{1}{4}$ in. long and $\frac{1}{8}$ in. in breadth, the fifth egg being very small, measuring barely $\frac{1}{8}$ in. by $\frac{1}{16}$ in. They have the ground color white, with the slightest tinge of greenish-blue, and are blotched and speckled with rust-brown and purple-gray; two are scrolled with dark brown.

Another nest with six eggs, found on Gully Rocks June 23, 1895. A compact, neatly constructed nest, similar to the one described, but without the quantity of wool, and a much smaller quantity of feathers, which are principally interwoven. The six eggs (full complement) of quite a different type, the ground color being grayer and without any rust-brown markings, being blotched and speckled with pale lilac, and spotted and scrolled with purple-black.

One odd egg also found on Gully Rocks; similar form as the first clutch mentioned. Mr. Jackson tells me: "Nests and eggs were plentiful upon the southern islands of the group, and I photographed a nest and eggs in a cleft rock upon Cape Flora."

EIDER-DUCK (*Somateria mollissima*).—Of this species Mr. Jackson gives me the following note, which is of interest, as the eider-duck is supposed to be an especially abundant species on Franz-Josef Land:

"A nest containing one egg on the point of hatching, and two chicks was found upon the low spit of Cape Mary Harmsworth. The nest consisted entirely of down, with three pieces of old drift-wood laid as a kind of fence around the nest. This was the only case of a nest being seen by us. I photographed the egg, chicks, and nest."

The egg referred to I received with the ivory-gulls', it being a normal egg in size and of the grayish-green color.

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PURPLE SAND-PIPER (*Tringa striata*).—Four eggs. A very handsome clutch, varying from $1\frac{1}{4}$ in. to $1\frac{1}{2}$ in. long by $\frac{3}{4}$ in. in breadth. The ground color is pale green, boldly blotched and mottled with rich reddish-brown, of different depths, and underlying markings of purplish-gray. The markings run in an oblique direction similar to the markings on the eggs of the common snipe, and excepting for their smaller size it would be impossible to distinguish them from certain varieties of the eggs of that species.

"The nest was found by Mr. H. Fisher upon a swampy bank, about thirty feet above the sea, on the eastern side of Cape Flora, on June 25th.

"The nest was a mere hollow in the ground, and contained the four eggs."

The hen bird showed great anxiety on his approaching the nest, and by a variety of antics endeavored to attract him away from it, much in the same manner of the lapwing does. Mr. Jackson adds that "the nests of this bird are exceedingly difficult to find, as this was the only one discovered, although many hours were spent at various times in searching for them. The birds were fairly common upon all the capes visited on the southern coast of Franz-Josef Land, Cape Mary Harmsworth excepted."

As the purple sand-piper breeds as far south as the Faroe Islands, there is considerable interest attached to the breeding range of this bird; and there is every probability that it may eventually be discovered to be actually a British breeding species.

GLAUCOUS GULL (*Larus glaucus*).—A clutch of two eggs measuring $2\frac{1}{2}$ in. by $2\frac{1}{4}$ in. and $2\frac{3}{4}$ in. by 2 in. respectively. The ground color is pale olive-buff, or stone color, spotted with different shades of brown, purplish-gray, and ash-gray. The nest was found by Mr. Jackson upon a precipitous grassy mound (formed of broken debris from the cliffs above and guano from the guillemots) above the lower tier of rocks overhanging the talus of Cape Flora, at an altitude of about six hundred feet above the sea. Mr. Jackson gives me the following interesting particulars: "The nest consisted of a mass of dried grass, feathers, and moss, and was of considerable dimensions. It contained two eggs. One of the birds, on my approaching the nest, scattered some of the materials of the nest over the eggs, with intent to conceal them, undoubtedly. The old birds showed considerable courage in defending the nest, swooping down within a foot or two of my head, and uttering loud screeches as they passed. Two or three more couples were seen nesting in more or less inaccessible places upon most of the capes along the southern coast."

KITTIWAKE GULL (*Rissa tridactyla*).—Twenty-six eggs collected at Cape Flora by Mr. Child from June 21st to June 30th, 1895. A nice, variable series, both in size and coloring; measuring in length from $2\frac{1}{4}$ in. to $2\frac{1}{2}$ in. and in breadth $1\frac{1}{4}$ in. to $1\frac{1}{2}$ in. The ground color varies from pale greenish-blue to dull olive-buff. The smallest specimen is only faintly spotted with ashy-gray, evenly distributed over the surface. In this egg the usual brown markings are indicated only by a few minute

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pecks hardly visible. One egg is very handsomely blotched with very large confluent brown blotches, and the usual underlying gray markings on a pale buff ground; another has the ground color pale greenish-blue, profusely sprinkled over the large end with small deep purple-brown and ash-gray dots. Over the rest of the surface they are sparsely and evenly distributed.

Mr. Jackson found these birds nesting in colonies upon most of the southern capes, generally on the rocks of the cliffs below those chosen by the guillemots; "but occasionally the colonies of kittiwakes were sandwiched in among the looms [guillemots]. The nests were of considerable bulk, and constructed of dried grass, moss, and feathers, with a shallow depression for the eggs."

Several hundreds of kittiwakes' eggs were obtained by Messrs. Jackson and Blomkvist at Cape Flora, which were utilized as food.

IVORY-GULL (*Pagophila eburnea*).—Eggs of the ivory-gull are extremely rare in collections. In 1885, when the third volume of Seebohm's *British Birds* was published, only four authentic eggs were known to exist. Of these he says: "The egg obtained by McClintock is in the Museum of the Royal Dublin Society; two eggs obtained by Malmgreen are in the Stockholm Museum, and a third [fourth] is in the collection of Mr. Benzon in Copenhagen." But in *The Ibis* for 1888 Professor Collet published a description of others, together with a plate of two eggs and a young bird in the down. Therefore, it was no small amount of pleasure for me when I received for preservation last autumn the twelve ivory-gulls' eggs collected by Mr. Jackson in Franz-Josef Land.

As they were then unblown, the colors were in some considerably brighter than they are now. This is particularly noticeable in those having the ground color of a light greenish hue. I figured three of the eggs directly after being blown, and one, which then had a distinctly green hue, shows now only the faintest indication of green in the ground color. The following is a table of measurements of the twelve specimens, which may be of interest to ornithologists generally:

		LENGTH		BREADTH			
Egg No.		1	. . . . .	$2\frac{3}{10}$	inches by	$1\frac{1}{2}$	inches
"	2	. . . . .	$2\frac{5}{10}$	"	"	$1\frac{1}{8}$	"
"	3	. . . . .	$2\frac{1}{2}$	"	"	$1\frac{1}{2}$	"
"	4	. . . . .	$2\frac{2}{10}$	"	"	$1\frac{1}{8}$	"
"	5	. . . . .	$2\frac{2}{10}$	"	"	$1\frac{1}{2}$	"
"	6	. . . . .	$2\frac{1}{2}$	"	"	$1\frac{1}{2}$	"
"	7	. . . . .	$2\frac{2}{10}$	"	"	$1\frac{1}{2}$	"
"	8	$2\frac{2}{10}$	"	"	$1\frac{1}{2}$	"
"	9	$2\frac{2}{10}$	"	"	$1\frac{7}{10}$	"
"	10	$2\frac{1}{2}$	"	"	$1\frac{7}{10}$	"
"	11	$2\frac{3}{10}$	"	"	$1\frac{7}{10}$	"
"	12	$2\frac{3}{10}$	"	"	$1\frac{2}{3}$	"

} broadest

} longest

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In six eggs the ground-color is olive-buff, but varying slightly in depth; in three it is pale greenish-buff; one dull buffish-olive, one ochreous-olive, and one greenish-ochreous-olive. They are blotched and spotted (varying from large blotches to minute specks) with different hues of brown, from dark purple-brown to light yellow-brown; and underlying markings of varying shades of gray, from purplish-gray to light bluish-ash. One specimen is considerably streaked and scrolled with the different hues of brown; and one is but slightly spotted with brown, but has the large end almost completely covered with large confluent ash-gray blotches, which almost obliterate the pale ochreous-buff ground color. They very closely resemble kittiwakes' eggs in color, much more so than they do common gulls', but are similar to the latter in size.

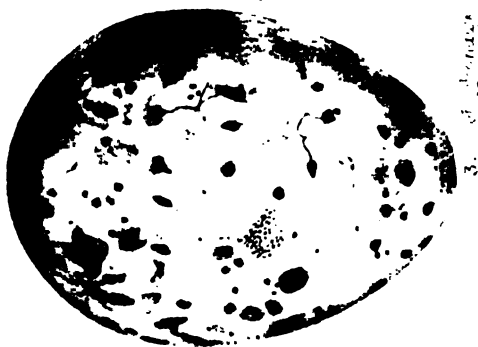
The twelve eggs were obtained at Cape Mary Harmsworth on August 7, 1897. Ten of them were collected by Mr. Jackson, and two by Dr. Koettlitz.

From the following most interesting account by Mr. Jackson of the nesting of the ivory-gull, it is evident that this gull usually lays two eggs, as the single eggs found were addled, the companion egg having been hatched.

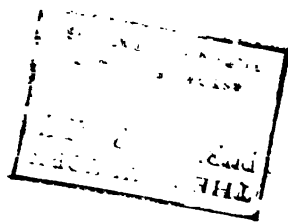
Mr. Jackson writes: "Upon our landing upon the low spit of fairly level ground, upon which as many as twelve raised beaches can be made out and are covered with rugged basaltic stones and boulders, we noticed great numbers of ivory-gulls hovering around and seated on the ground. We soon became aware that they were nesting upon the ground of this barren spot, the only vegetation of which consisted of a few lichens, mosses, a saxifrage, and a grass growing in the scanty soil. Here and there are a few ponds of thaw-water and swampy spots.

"We approached the nests, which consisted of a pile of moss raised about six inches above the ground, with a base of from two feet to thirty inches in those I measured, with a slight depression at the top, in which the eggs are deposited. Here and there in the nests were a few white feathers. Owing to the late date most of the nests were without eggs, but in six cases I found six single eggs, and in two nests two, all of which I believe to have been addled, which accounted for their being there. I, however, brought them home to be blown by an expert, fearing that they might contain large chicks. This Mr. Frohawk kindly undertook to do. Dr. Koettlitz also collected two, which he handed to me. Running about among the dark stones were large numbers of young gulls in their downy plumage of grayish-white, and a few dead ones lay here and there.

"These birds were found building in isolated colonies over the greater part of the spit, which probably contains two or three square miles of country bare of snow. As we approached them the birds became wildly excited, dashing down within a foot or so of our heads with wild screeches



THE IVORY-GULLS' EGGS



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and screams. So bold were they that in more than one case members of the party were actually struck by them.

"I took several photographs of the nests containing eggs and young; also of a gull sitting upon a nest, and one negative of a general view of the nesting-ground.

"They were nesting on this spot literally in hundreds. We took a number of young birds on board the ship, seven of which lived to reach the Thames, where six died, leaving only one, which I was able to send to the Zoological Gardens, where it now is."

RICHARDSON'S SKUA (*Stercorarius crepidatus*).—I believe this to be the first recorded instance of this skua breeding so far north as Franz-Josef Land, as this species is generally considered less Arctic in its habits than the other skuas. Mr. Jackson informs me that Richardson's skua is the only skua seen on Franz-Josef Land, and that he has photographs of the adult birds, their nests and eggs, taken at Cape Flora. The nine eggs in the collection were obtained from July 6th to July 22d from Cape Gertrude, Cape Grant, Cape Crowther, and Bell Island. They all agree exactly in all particulars with normal eggs of *S. crepidatus*. They measure in length from $2\frac{1}{8}$ in. to $2\frac{7}{8}$ in. and $1\frac{3}{4}$ in. to $1\frac{1}{2}$ in. in breadth. In the ground color they vary from pale green-buff to light olive-brown, and are blotched, speckled, and scrolled with different shades of brown and underlying markings of brownish-gray. In three the markings are confined to a zone round the large end, the others having the markings more or less evenly distributed over the surface.

BRÜNNICH'S GUILLEMOT (*Uria bruennichi*).—A series of thirty-six eggs, mostly collected on June 30, 1895, at Cape Flora. Three are labeled "Cape Grant, August 5th, 1895."

These eggs are so similar to those of the common guillemot (*U. troile*) that it would be practically impossible to distinguish them. But certain characters of the former species I will presently allude to.

I may here mention that the most northern breeding range of the common guillemot is Bear Island, in latitude 74° , which is comparatively mild, being influenced by the Gulf Stream; otherwise the northern range of this bird is below latitude 64° . Above this latitude its place is taken by *U. bruennichi*.

In shape the eggs of *U. bruennichi* are, on the average, decidedly less pyriform, shorter and rounder, some being decidedly so; while some are as elongated and attenuated as *U. troile*. They are also, as a rule, greener in ground color, and have less variation in the coloring generally. Thirty-one out of the thirty-six have the ground color more or less green, the majority being decidedly green, and have less of the blue tinge that is so frequent in the eggs of *U. troile*. Four only have the ground color white, and but one with a creamy-white ground; and the only specimen which varies greatly from the rest is finely scrolled with cotton-like lines of

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ochreous-brown and purple-gray, which are densely massed together over the large end; and others are rather thickly and evenly scattered over the rest of the surface. Another specimen is nicely blotched with lilac-gray and black, and three others have pale brown markings. In all the rest the markings are either black or brownish black. Another character of some distinction, but by no means constant, is that in some specimens the markings have pale centres forming irregular rings, which is seldom the case in eggs of *U. troile*; but I have specimens of the latter from Orkney exhibiting precisely similar markings; therefore this cannot be a certain distinguishing character. In by far the greater number of these *U. bruennichi* eggs the markings are solid, and in no way differing from those of *U. troile*.

BLACK GUILLEMOT (*Uria grylle*).—Four normal eggs collected from June 23 to July 3, 1895, at Cape Flora and Gully Rocks. They measure: length from $2\frac{1}{4}$ in. to $2\frac{3}{8}$ in. and $1\frac{3}{8}$ in. to $1\frac{1}{2}$ in. in width.

LITTLE AUK (*Mergulus alle*).—Five eggs, varying in length from $2\frac{1}{16}$ in. to $1\frac{5}{16}$ in., and in breadth $1\frac{9}{16}$ in. to $1\frac{1}{2}$ in. The color is of the palest greenish-blue, very faintly spotted and streaked with ochreous. One specimen shows the faintest lilac-gray blotches. Two are from Cape Grant, July, 1895; and one from Cape Flora, July 16, 1895.

NOTES ON THE BIRDS OF FRANZ-JOSEF LAND SEEN BY
THE JACKSON-HARMSWORTH POLAR EXPEDITION, 1894
TO 1897. BY FREDERICK GEORGE JACKSON

AN excellent article on the avifauna of Franz-Josef Land, by Mr. W. Eagle Clarke, has appeared in *The Ibis* for the present year (pp. 249 to 277). This memoir is especially valuable, as Mr. Clarke has collected together under one heading all the references to the birds observed by previous visitors to the Archipelago, including Herr J. von Payer, Mr. Leigh Smith, Dr. Neale, Dr. Nansen, and Colonel Feilden. In Mr. Clarke's paper are given some observations by Mr. W. S. Bruce, who accepted the hospitality of my expedition during the last year of our stay in Franz-Josef Land. The specimens prepared by Dr. Koettlitz were sent to the British Museum for examination, and it is a matter for regret that those which Mr. Bruce had in his possession were not despatched there by him also, so that the collection could have been treated as a whole; or, on the other hand, Mr. Harmsworth and myself would gladly have consented to the remainder of the specimens being submitted to Mr. Eagle Clarke, who, it must be confessed, has done his description of the portion of the collection intrusted to him in his usual admirable and complete manner. To Dr. Bowdler Sharpe I am greatly indebted for the examination of the specimens sent to the British Museum, and much help in their determination.

SNOW BUNTING (*Plectrophenax nivalis*).—A few of these birds still remained on Cape Flora on our arrival in the *Windward* in September, 1894. I shot a young bird on the talus there on September 23d, and others did not leave for the south until a few days later. The winter began early and severely that year. Snow-buntings reappeared in the springs of 1895 and 1896, upon April 27th of each year. None were seen after October 6, 1895, when I noticed one young bird, and I saw three on October 2, 1896, but none after. They were reported to have appeared on Cape Flora in 1897 on the 16th of April, when we were away sledging.

Dr. Nansen records snow-buntings from Torup Island (latitude 81° 30') in August, 1895. This bird was noticed by us upon all the capes on the southern coast of Franz-Josef Land, from near Cape Cecil Harmsworth to Cape Neale, and upon several spots on the eastern side of the British Channel.

Several nests were taken upon Cape Flora, where it breeds in consider-

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able numbers upon the raised beaches among the stones, from a few feet above sea-level to a height of 80 feet, and I saw two nests upon the talus below the rocks at a height of 200 feet.

One nest which I found in the deep cleft of a rock upon the plateau I photographed on July 20, 1896, and also another built on a ledge of a huge basaltic boulder called Sharpe's Rock, where there was a nest in the same spot three years in succession.

We could have taken large numbers of eggs had we not protected these birds. They had paired on Cape Flora by the first week of June. Most of the eggs hatched out towards the middle of July. The young birds remained later in the autumn than the adults.

LAPLAND BUNTING (*Calcarius lapponicus*).—I shot two of these birds on June 10 and one on June 11, 1896, all being cocks. One was killed on June 9, 1897, by Mr. Armitage. Mr. Eagle Clarke thinks that they were probably stragglers from Novaya Zemlia, where the species is uncommon during the nesting season. It has not been recorded from Spitzbergen.

With his opinion I am inclined to agree, as at no other period of our stay in Franz-Josef Land were other examples of this bird seen, and I believe we bagged all that reached Cape Flora.

Still its appearance two years in succession presents a reason for leaving this an open question, in which possibly Mr. Clarke would have coincided had he known of its second appearance. As he remarks, this was an unlooked-for addition to the fauna of this Archipelago.

SHORE-LARK (*Otocorys alpestris*).—A single specimen was obtained, on the 9th of June, 1897, upon Cape Flora. It is probably only a straggler to Franz-Josef Land, as it is unknown in Spitzbergen. It is, however, not an uncommon visitor in Novaya Zemlia in summer.

N.B.—A species of redpoll (*Cannabina holboelli*?) has been spoken of by Dr. Neale, but no specimen was obtained, and it was probably the snow-bunting which was intended.

COMMON SWALLOW (*Hirundo rustica*).—On May 27, 1896, I find the following entry in my journal:

"About nine o'clock this evening Heyward came into the hut to tell me that a strange bird was flying near. I took my gun and, followed by Blomkvist, went out and fired at what appeared to be a small black and white bird, having a forked tail, and generally resembling the common swallow. Blomkvist at once remarked upon the similarity.

"I unfortunately only wounded it as it flew by, and it either fell or settled among the boulders near the flag-staff. Hours of search failed to discover it, as the snow was falling heavily at the time, rendering it more difficult to see a small object."

The common swallow has been found in Iceland, Spitzbergen, and Novaya Zemlia, so there is nothing very remarkable about its appearance in Franz-Josef Land. It is, however, undoubtedly only a casual visitor here.

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SNOWY OWL (*Nyctea nyctea*).—During the first twelve months we were in Franz-Josef Land we saw no examples of this bird, although the pellets and feathers frequently seen upon all the capes from Cape Flora to Cape Neale convinced me that the bird had been there.*

Dr. Koettlitz reported to me that an owl had been seen on May 28, 1896, which was the first noticed that spring. On June 30, 1896, Mr. Armitage shot one specimen with a rifle, and on August 26th Mr. Wilton captured a sick one alive. They were very wild and difficult to approach.

Dr. Neale states that he saw the first snowy owl on Cape Flora on the 8th of February, and others were noticed on the 16th and 19th of the same month.

All had left us by the end of the first week of September.

On May 30, 1897, I saw the first snowy owl of the season, which had killed a kittiwake and was feeding upon it. Mr. Heyward told me he believed he saw one on the previous day.

The species was frequently seen on and near Cape Flora after this date, but no nest was ever discovered, although it is quite possible it may breed upon Franz-Josef Land.

Snowy owls at Cape Flora preyed upon the young of the loom, kittiwake, snow-bunting, and other birds, and I have frequently known them to kill adult kittiwakes.

We saw no lemmings, ptarmigans, or willow-grouse in Franz-Josef Land.

JERFALCON (*Hierofalco candicans*).—Dr. Neale saw a falcon which he believes to have been the Greenland jerfalcon (*Hierofalco candicans*) on the 24th of April, 1882, near Cape Flora.

I did not meet with a hawk of any kind in Franz-Josef Land, but Mr. Eagle Clarke thinks that the Greenland jerfalcon is the species which has occasionally been seen in Spitzbergen and Novaya Zemlia.

BRENT-GOOSE (*Bernicla brenta*).—The first brent-geese were seen in 1895, at midnight on June 8th. Mr. Armitage shot two on the thaw-water pond near the hut on Cape Flora, on the 10th; and in 1896 I saw the first, a flock of eight on June 3d, and on the 10th six more. None were seen after September 1, 1895, when I succeeded in bagging two out of a large flock.

In 1896 none were seen after the middle of August.

Brents reappeared on Cape Flora on June 10, 1897, when four were seen and one shot, and they put in an appearance intermittently in twos and threes throughout the summer, chiefly upon the grassy slopes at the east end of the plateau of Cape Flora, and at some thaw-water ponds at the western extreme of the cape.

* On September 6, 1895, I saw a bird late in the evening seize a young loom coming down from the rocks of Cape Flora, which I believe to have been a snowy owl.

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Dr. Neale, of Mr. Leigh Smith's expeditions, speaks of meeting with these geese, and gives the date of their departure as September 22d. We found no nests.

EIDER-DUCK (*Somateria mollissima*).—The first seen of these birds was at Cape Gertrude on June 24, 1895, when a duck and a drake were obtained. They were alone. Two or three pairs were seen throughout the summer at Cape Flora and Cape Grant.

In 1896 another specimen was obtained, a drake, which I shot at the thaw-water ponds at the west end of Cape Flora on May 28th. On August 28th another single bird was reported to have been seen. On July 15, 1897, a drake and duck were also seen.

On August 7, 1897, an eider-duck's nest was found upon Cape Mary Harmsworth containing two young birds and a nearly hatched egg, which I photographed. Afterwards a large number of ducks with their young were observed swimming in the water at the northern extreme of the spit there.

Nowhere else in Franz-Josef Land did we see them in any numbers.

TURNSTONE (*Streptilas interpres*).—When out with my gun on May 27, 1896, by the thaw-water pond near the hut upon Cape Flora, I shot the only specimen of this bird seen by us during our three years' stay in Franz-Josef Land.

Mr. Clarke remarks that it is probably a mere straggler, as it is a scarce bird in Novaya Zemlia, with which opinion I entirely agree.

BONAPARTE'S SAND-PIPER (*Tringa fuscicollis*).—On June 28, 1897, I saw a small sand-piper near the thaw-water pond by the hut on Cape Flora, and called Mr. Wilton out to shoot it. None of us were able to identify this bird, but I learn from Mr. Eagle Clarke that it is a Bonaparte's sand-piper. No other specimen of this American species was noticed, but it is more than possible that other examples had been mistaken for the purple sand-piper, which was common.

The smaller size and lighter color caught my eye when it was in a sitting position, which would not be as noticeable when on the wing, so others may have previously escaped us. Mr. Clarke remarks: "This bird is not only a new and remarkable addition to the ornis of Franz-Josef Land, but is the first authentic example of this American species that has been obtained in Europe elsewhere than the British Isles, for the Icelandic record is not regarded as satisfactory. The occurrence of this sand-piper in Franz-Josef Land, so far away from its accustomed haunts, is very remarkable; but almost equally remarkable is the fact that it should find its way there in the breeding season. It has only visited the British shores during the migratory period in the autumn, and its occurrence in Franz-Josef Land in summer admits of no satisfactory explanation."

PURPLE SAND-PIPER (*Arquatella maritima*).—These birds had left Franz-Josef Land by September 8, 1894, when we arrived at Cape Flora, for in

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this year the winter began unusually early. The first seen in 1895 was on June 8th, when I shot a single specimen, and I saw the last upon September 18th.

In 1896, I see by my journal that the first purple sand-piper was seen on May 28th, and shot by me. They left us somewhat earlier in the autumn of this year than in 1895, all having departed by September 10th.

In 1897 the first seen were on May 27th, when three were noticed at the east end of the plateau upon Cape Flora.

The purple sand-piper nests upon Franz-Josef Land, and Mr. Fisher, when botanizing, found a nest and four eggs upon a raised beach covered with grasses upon Cape Flora, on June 25th. The young are hatched in July.

Payer is responsible for the introduction of the knot (*Tringa canutus*) as a bird found in Franz-Josef Land, and Colonel Feilden thinks that the "brown snipe" of Mr. Leigh Smith's expedition may be the knot also.

Mr. Eagle Clarke very wisely concludes that both these references allude to the purple sand-piper. I believe that if the knot visits Franz-Josef Land we could not have failed to observe it.

The mating note of the purple sand-piper, which it emits when soaring to a low altitude, much like a lark, is very beautiful.

SANDERLING (*Calidris arenaria*).—Although the occurrence of the sanderling on Franz-Josef Land is not improbable, and Dr. Neale says that it was seen near Cape Flora, I never met with the species. It has not been noted from Novaya Zemlia, although it visits Spitzbergen.

ARCTIC TERN (*Sterna macrura*).—The first birds seen in 1895 were on June 20th, when I shot four specimens which were fishing in cracks in the sea ice at Cape Flora; the rest of the flock remained about the cape for a few days, and then disappeared. Another was shot on Bell Island on August 10th. After that none were seen until September 17th, when I observed a flock of five pass the hut on Cape Flora, evidently on their way south; and these were the last noticed that year.

I first saw terns in 1896, on June 21st, fishing in cracks in the ice at the same spot as in 1895.

Two others were seen a few days later at the northern end of Windy Gully, hovering over the low sandy beach there. Thinking they might be nesting, I examined the ground carefully, but without success. The species has never been found breeding in Franz-Josef Land, although it is more than possible that it does nest there. After the above date none were seen this year. On June 24, 1897, I shot a male and female at Cape Flora.

ROSS'S GULL (*Rhodostethia rosea*).—I saw what I still believe to have been an example of Ross's gull on July 5, 1897, and from my much longer experience of the Arctic avifauna, and that of Franz-Josef Land in particular, I am not likely to have fallen into the error of mistaking this bird for a kittiwake, which Mr. Bruce apparently finds so easy.

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Ross's gull bears little resemblance to the adult kittiwake, as Mr. Bruce appears to imagine; and at that time of the year no young kittiwakes were flying. The bird was *alone* when first I saw it, and did not mix with the kittiwakes until after I had called my companion's attention to it.

Payer records having secured a specimen off the southern coast of Franz-Josef Land, and, as is well known now, Dr. Nansen found the species in some numbers off Hvidtenland, to the northeast of the Archipelago.

GLAUCOUS-GULL (*Larus glaucus*).—In common with other birds, the species left for the south earlier than usual in the autumn of 1894, and by September 16th all the young ones even had departed.

They returned again towards the middle of March, and on September 24, 1895, the last of these birds (a young one) was seen. The last one observed in 1896 was on September 21st.

A couple or two of these birds we found nesting upon all the capes reaching from Cape Flora to Cape Neale. They built as a rule on inaccessible points among the high basaltic cliffs. The only eggs we obtained I secured on June 29, 1896, when I found a pair nesting upon the top of the lower tier of rocks on Cape Flora. We captured several young birds at various times, and kept one alive in the hut through the winter of 1895-96. The old birds defend their nest with considerable boldness. They preyed on the young looms, and on old looms, if the latter were wounded, as they did also upon any defenceless bird. This species is widely distributed all over the Archipelago.

Mr. Eagle Clarke points out that the birds seen by Dr. Nansen in the northeastern portion of Franz-Josef Land, and at first referred to by him as herring-gulls, were doubtless *Larus glaucus*.

IVORY-GULL (*Pagophila eburnea*).—This gull we found to be fairly plentiful and widely distributed in Franz-Josef Land, and I noticed it as far north as $81^{\circ} 19' 30''$ N. latitude in Cecil Rhodes Fjord, and as far east as Cape Cecil Harmsworth, and off the coast of Bromwich Island in Markham Sound, as far west as Cape Mary Harmsworth, the most westerly point of Franz-Josef Land.

None were seen in the autumn of our arrival in 1894.

A number were reported to me as having been seen on March 5, 1895, and I saw one as late in the autumn as October 14th, after which none were noticed. A number of young ones, however, put in an appearance between September 18 and October 6, 1895.

In 1896 I did not see any, or hear of any being seen, until March 20th and several young ones put in an appearance on April 22d, and I saw one adult in Markham Sound on April 2d. They had left us in the autumn by the end of the first week in October.

Mr. Leigh Smith (Proc. Roy. Geogr. Soc. iii. p. 131) speaks of its nesting upon some low basaltic cliffs at May Island, where some young birds were captured.

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The only other spot in Franz-Josef Land which we had any reason to believe to be its nesting place is Cape Mary Harmsworth, where we landed on August 7, 1897.

The Cape consists of a long stony spit formed of raised beaches in terraces, upon which is very little vegetation, projecting from the high ice-clad land behind. Deep water runs right up to the shore.

Immediately we landed we saw large numbers of shrieking and screaming ivory-gulls collected in isolated colonies all over the two or three square miles of bare, stony ground. As we advanced we saw patches of old moss in various directions, which proved to be nests of this gull. As we came up to them the birds became exceedingly excited, swooping down upon us with loud screeches and screams within a foot or two of our heads, and one or two of our party were even struck by them.

In nearly all cases the nests were empty, owing to our late arrival, but a few contained young birds, and other young ones were running about in scores. Fortunately a few nests had eggs in them still, and I collected twelve, two being handed to me by Dr. Koettlitz, which, on arrival in England, I handed over to an expert, for I feared to attempt to blow them on the spot, expecting to find large chicks in them. These eggs, however, proved to be addled. I am much indebted to Mr. F. W. Frohawk for the excellent manner he performed this anything but pleasant operation.

As we advanced across the tongue of land we came upon other patches of nests, and, as we approached, their owners took up the excitement and swooped and screeched in their vain endeavors to repel the invaders. The birds belonging to the previous colony quieted down as we left it, and their screeches and demonstrations ceased.

In nearly all cases the nests were empty, but in some I found a single egg, and in two cases two eggs.

The nests consisted of a low cone-shaped pile of dry moss, with here and there a white feather or two. They were six inches high, with a base of from two feet to thirty inches, in those I measured, with a slight depression at the top, where the eggs were laid. I took a number of photographs of these nests, with the eggs and young birds; also one with the parent bird sitting on a nest containing two eggs, which I again photographed after it had flown off. I also took several photographs of the general aspect of the breeding-ground. Had we been there a few weeks earlier, we could literally have obtained hundreds of eggs. We took on board eight young birds, and seven of these reached the Thames on September 3, 1897, but next day six were found dead. The remaining one I sent to the Zoological Society's Gardens in Regent's Park.

KITTIWAKE (*Rissa tridactyla*).—On our arrival at Cape Flora, on September 8, 1894, we found a few young kittiwakes still remaining, which stayed with us until near the end of the month.

I noted the first kittiwake in 1895 on April 11th, while shooting looms

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for the ship's company, and we saw the last for that year on September 30th; it was a young bird.

In 1896 the first individuals were observed on April 20th, and a flock of them was seen on the 26th. On September 12th only a few remained, and all had left us again by September 25th. In 1897 the first lot of kittiwakes were reported to have been seen on April 14th. On June 7, 1895, I noticed that they had begun building on Cape Flora, and were carrying moss in their beaks from the slope of the talus. On June 17, 1896, I looked into a number of nests on the rocks of Cape Flora, and found that although the nests, or most of them, were completed, there were no eggs in any of them. On June 24th Blomkvist and I obtained twenty-seven eggs, but two days later we found that most of the eggs we got on the 26th had been sat upon and contained young. With one exception all the nests which were roughly made of grasses and moss, with a few feathers, contained one and two eggs, but in one case I found three eggs in a nest. We found them nesting in colonies among the looms on the basaltic rocks, but as a rule they preferred the lower rocks below the looms. We found this a very widely distributed bird in Franz-Josef Land, nesting upon the southern rocks from Cape Flora to Cape Neale. On August 21, 1896, Mr. Wilton and I captured seventeen kittiwakes (three adults and the rest young ones which could fly). After attaching labels to some of them, I handed over the rest to Mr. Bruce to finish, in the hope that they might be captured in some southern latitudes. I took many photographs of these birds nesting upon the rocks of Cape Flora.

RICHARDSON'S SKUA (*Stercorarius crepidatus*).—We saw none of these birds on our arrival in 1894.

They reached Cape Flora June 11, 1895, when I shot two specimens. I also shot a young one on September 4th. The last example of these birds I saw on September 14th. In 1896 the first skua was seen on June 13th, but none were noticed that autumn after September 9th. We found Richardson's skua nesting upon Bell Island on July 11, 1895; upon Cape Grant on July 15th; on Cape Crowther on July 22d; and discovered a nest upon Cape Neale two days later, which a bear had evidently helped himself to.

We obtained two eggs from each of the nests upon Bell Island, Cape Grant, and also on Cape Gertrude, and a single incubated egg from the nest upon Cape Crowther. I also shot the parent birds for specimens. On July 11th we found a nest of Richardson's skua with two eggs upon Cape Flora, which I photographed together with the parent birds. These skuas defend their nests with great boldness, swooping down within a foot or two of the intruder, and alternating these tactics by performing all sorts of odd antics, such as pretending to be wounded to entice the enemy away. They prey upon kittiwakes by chasing them, and making them throw up their food, which the pursuing skua immediately swallows. I have even

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known them treat the glaucous-gull in the same undignified manner. This species was the only skua we saw actually upon Franz-Josef Land.

POMATORHINE SKUA (*Stercorarius pomatorhinus*).—I saw and shot a number of these birds when in the ice to the east of Spitzbergen, in latitude $77^{\circ} 30'$ N. and longitude $35^{\circ} 15'$ E., when on our way home, but none were ever observed on Franz-Josef Land.

MANDT'S GUILLEMOT (*Uria mandti*).—This was the first bird to appear after the winter, and a few examples remained to the last, in the autumn, the species appearing on two occasions about or before the time the sun returned, and a few young ones in winter plumage were seen during three autumns, a few days after or about the time the sun had sunk for the long Arctic night.

In the autumn of 1894 I saw two dovekies in the water at the edge of the floe off Cape Flora, partially in winter plumage, on October 23d.

On February 25, 1895, a flock was seen flying over the ice to the south of the cape. On August 11th of the same year I shot a young bird in the sea off the cape, and on October 10th a dovekie in winter plumage was seen on the Gully Rocks.

In 1896, on February 24th, I saw two partially in winter dress, and on February 27th I saw a flock of about thirty, some partially in winter plumage, two entirely so, and one only in summer dress.

On October 20, 1896, I saw eleven swimming about in the bay ice, and succeeded in shooting two, an adult in winter plumage and one young hen bird in winter dress also, with the legs nearly as red as in the adult, but with a tinge of brown in them still.

On October 22d Mr. Armitage killed three more.

We found this a widely distributed bird in Franz-Josef Land, and noted it wherever our travels extended. We saw it in Cecil Rhodes Fjord and Leigh Smith Sound to the north, to the west off Cape Mary Harmsworth, and to the east in Markham Sound and near Cape Cecil Harmsworth. We found it nesting in small numbers among the rotches, whose company it seemed to prefer as a rule. They nest in cracks upon the rocks of all the spots we visited on the southern coast from Cape Flora to Cape Neale, and I have no doubt that it breeds upon Capes Albert Markham, Richthofen, Fisher, McClintock, Bruce, Taylor, and St. Chad's Head, as I noticed birds at these places in the early spring. Its peculiar, short, plaintive, and very distinctive note welcomed us at Cape Neale on our sledge journey in 1897.

LITTLE-AUK (*Alle alle*).—This bird, with the exception of the dovekie, was the first to return to us after the winter, and practically arrived with the dovekie, but left earlier in the autumn. We saw none on our arrival in Franz-Josef Land in 1894. I saw a flock on February 26, 1895, and Dr. Koettlitz reported having seen some on the previous day. On March 5th

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I shot a rotche partially in winter dress. On March 6th a few were on the cliffs of Cape Flora.

Both in 1895 and 1896 all the little-auks or rotches had departed by August 28th. On February 27, 1896, Dr. Koettlitz saw a flock of rotches off Cape Flora.

On March 6, 1897, I saw a flock of seven fly over the ice to the south of Cape Flora; these were the first seen that year.

Mr. Eagle Clarke remarks as follows: "Dr. Nansen observed it to the northeast of Franz-Josef Land in latitude 82° N. on the 10th of June, 1895, and on the 26th of June many were seen in the same latitude. At the isles of Hvidtenland on the 8th of August, a number of little-auks were noted; and at Torup Island, on the 17th, there were 'myriads.'"

On the 10th of March, 1896, at his winter-quarters on Frederick Jackson Island, Dr. Nansen mentions that "millions" were seen flying up the sound at 6 A.M., and "when we went out at two in the afternoon there was an unceasing passage of flock after flock flying out to sea, and this continued until late in the afternoon." It was also observed (p. 805) that this species and the black guillemot invariably set forth from the land at certain times of the day towards the open sea, returning in broken lines to their nest-rocks again. At the basaltic cliffs of Cape Fisher, on the 31st of June, 1896, "we found these birds breeding in swarms." Dr. Neale tells us that "the little-auk departed from Cape Flora in the autumn of 1881 during the first week of September; and was first observed there in the spring of 1882 on the 2d of March. It arrived at Frederick Jackson Island in 1896 on the 25th of February, as related by Dr. Nansen."

We found this bird wherever we travelled in Franz-Josef Land. I found it at Cape Fisher and Cecil Rhodes Fjord in the spring of 1895, and in other spots; also near Cape Albert Markham, and in Vesey Hamilton Channel, besides many other places in the spring of 1896. In the spring of 1897 it was noticed upon the rocks of St. Chad's Head, in Leigh Sound, and on the northern coast of western Franz-Josef Land, flying over the Queen Victoria Sea. We found it nesting among the loose stones of the talus upon the following: Capes Neale, Crowther, Grant, and Stephens, and some in cracks in the rocks at these capes.

It also nests in fissures of the rocks upon Cape Flora, the Gully Rocks, and Cape Crowther.

We found incubated eggs at Cape Grant on July 14, 1895. The young remain in the nesting-place until fully fledged. I took many photographs from life of these birds.

[The occurrence of a puffin (*Fratercula arctica*) rests on the authority of Payer. We saw none in Franz-Josef Land.

It is a fairly common species in Spitzbergen, but is not found in Novaya Zemlia.]

BRÜNNICH'S GUILLEMOT (*Uria arra*).—All looms appeared to

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departed when we reached Franz-Josef Land on September 7, 1894, but we saw eight solitary examples on September 23d in a pool of water in the floes.

They reappeared in 1895, on March 19th, when I shot four specimens on the rocks of Cape Flora.

In the end of August 1895 and 1896 I shot many hundreds for food for the winter. By September 10, 1895, all had departed, but the vast majority had gone on August 30th. On September 30th of that year, however, I saw a solitary young one on a piece of bay ice which had evidently been left behind when the others departed for the south. Looms returned in 1896, on April 1st, to Cape Flora, and I heard one or two among the rocks on that date on David Wilton Island, but the majority had gone by August 26th, although a few stragglers remained until the 30th. We found looms nesting upon all the capes we visited along the southern coast in great numbers, with the exception of Capes Mary Harmsworth and Neale, and I have every reason to believe that they do so on the rocks bordering Melenius Sound, as I saw looms there in April. I also noticed them flying round Cape Fisher.

It occurred to me that it would be interesting to trace the migration of looms, and with this object I captured nineteen young ones on the rocks of Cape Flora, and brought them back to the hut, where Mr. Bruce attached a small copper label, upon which was punched a letter J. We then set them free, placing them in the sea to give them a fair start. He took the temperature of a young one, which he informed me was 107.1° F.

We noticed young birds coming down from the cliffs of Cape Grant on August 3d; they then fell a ready prey to the glaucous-gulls and snowy owls. At Cape Flora the descent always commenced somewhat later and lasted until the end of August. It was a pretty sight to see the old birds helping the young ones down to the sea from the cliffs 600 feet above it. The young one would jump from the ledge, open its wings, and parachute downward; the old birds would accompany it on its flight, sometimes supporting it by holding it by its tail until the sea was reached. I have seen several old birds looking after one young one at the same time. Blomkvist and I secured for food, by climbing, many hundreds of eggs from the ledges, upon which they rest without any protection in the way of a nest.

I took many photographs of looms nesting upon the cliffs, and in the water with their young.

RED-THROATED DIVER (*Colymbus septentrionalis*).—On August 10, 1895, I shot two of these birds on a shallow pond on Bell Island, and on the following day I killed a cock bird and a young one which were alone on a similar pond on Mabel Island, a mile or so distant from the first. With the exception of a pair seen at Cape Gertrude on June 28, 1896, they were the only examples we met with in Franz-Josef Land.

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I do not understand Dr. Neale's statement, as quoted by Mr. Eagle Clarke, who writes: "The red-throated diver has only come under the notice of Dr. Neale among all the previous explorers of Franz-Josef Land. Rain-geese (*Colymbus septentrionalis*), he tells us, were seen and shot on the cliffs 700 feet above sea-level, presumably at Cape Flora, but no nests were seen." Surely "on the cliffs" is a very unlikely position upon which to find red-throated divers.

FULMAR PETREL (*Fulmarus glacialis*).—A few of these birds remained at Cape Flora when we landed there on September 8, 1894, and left us a few days later.

In 1895 I noticed the first mollymoke on March 20th, and the last was seen on September 18th, when I shot a young one. In 1896 Blomkvist saw the first one of the year on March 13th, but in this year one specimen was seen on September 23d. This bird was found to be widely distributed in Franz-Josef Land, and we frequently saw it on May 1st, when sledging off Cape McClintock and elsewhere. Also in the end of March, 1896, I often saw it skimming over the ice in Markham Sound and in the British Channel.

We found it nesting in colonies upon the rocks of Capes Crowther and Grant, and on the Cooke Rocks, in very inaccessible positions, and we saw it flying about the cliffs of Cape Fisher on April 28, 1895.

Dr. Nansen mentions having seen it on June 16, 1895, to the northeast of Franz-Josef Land, and in August off Hvidtenland, and again on Frederick Jackson Island in September. Dr. Neale refers to the "molly" as a migratory bird, and mentions that it remained at Cape Flora as late as October 28, 1881, and returned on the 24th of April in the following spring.

NOTE: *Golden Plover* (*Charadrius plumbealis*).—This bird was not seen by us in Franz-Josef Land, but I shot one from the deck of the *Windward* on our voyage there on August 17, 1894, in latitude 70° 30' N. and longitude 50° 30' E., and secured it.

BOTANY OF FRANZ-JOSEF LAND. BY HARRY FISHER

PHÆNOGAMIA

THE chief features of this remarkably insular flora are the absence of willows, sedges, the heath family, the mountain-sorrel, the dandelion, the louseworts, and a few other species which in other Arctic regions attain a latitude as high as Franz-Josef Land.

The presence of the rare and beautiful grass (*Pleuropogon Sabinii* Br.) is quite as interesting as the absence of those plants above mentioned. This remarkable species was discovered by Captain (afterwards Sir Edward) Sabine at the winter quarters in the south of Melville Island, latitude $74^{\circ} 47'$ N., longitude $110^{\circ} 48'$ W., in 1819. Afterwards it was found in a few places in a southeasterly direction. Then Baer found it in Novaya Zemlia. Then in 1878 it was found in Actinia Bay, Taimur Island, by the *Vega* Expedition,* $76^{\circ} 15'$. Now that we have it from Franz-Josef Archipelago, four degrees farther north † than previous records, the distribution, which was always interesting, is now extremely so. We know now that there is a deep sea between Franz-Josef Archipelago and the Polar American Islands. It seems probable that the migration is by way of Siberia, and not across the pole. There is, however, nearly a hemisphere (155°) without a record. It should be carefully looked for between Taimur and Behring Straits. You will notice that it is unknown from Grinnell Land,‡ Greenland, and Spitzbergen, and between Taimur Island and Melville Island.

Most of the islands are completely ice-capped, but on the southern side of a few there are bold headlands of basalt, which have an average height of 1000 feet, exclusive of the ice-cap. The upper half of these headlands is precipitous rock, the lower portion being composed of loose débris, in some cases down to the edge of the sea. In others we have extensive débris on the western side, almost bare of any vegetation; the southern side being grassy and mossy, the eastern side being mossy towards the south and bare towards the north. The Phanerogams are almost confined to the south and southeast side of these headlands. At the base of the talus there is usually a raised beach, sometimes 400 yards wide, as on Cape Flora, but wanting in others, as on the southeast side of Cape Grant. On

* Kjellman.

† $80^{\circ} 3'$ N.

‡ Excepting Cape York (Nathorst).

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the west side of Cape Grant there are four raised beaches covered with moss (a doubtful fifth, probably belonging to the same age as the fourth). On Cape Stephen there are three. On Cape Flora there are three. On all of these there is a considerable amount of vegetation, chiefly mosses. In the wettest places they form lovely carpets of crimson, green, and gold.

There are similar raised beaches on other capes, varying in number however. There is a fine corrie on Cape Stephen, and a smaller one on Cape Grant, but, as these are both on the western side, the flora is almost confined to a few lichens. There is a beautiful corrie on Mabel Island facing south. Here we have an improvement in the vegetation when compared with any other spot, excepting the fine beach on the south-eastern side of Cape Stephen. A corrie is a Scotch name for a hollow in a mountain. In the Highlands we look in the corries for the more interesting plants—they are the sources of the streams and rills which trickle down the mountain-side.

In Franz-Josef Archipelago corries are very bare of vegetation, probably because they are all on the colder side of the headlands. This remark cannot be applied to the one on Mabel Island, however. In the height of the summer these corries had about an inch of water in the middle of a patch of mud and grit—I mean the water was about an inch deep. This was surrounded by barren débris.

Below the raised beaches already named we have the sea-beach of the present day, usually devoid of vegetation; and even when the plants descend to the very edge of the sea, they are of no interest. Unlike other regions, we have here no maritime plants.

There is a cold current running along the southern shores of this archipelago from east to west (approximately), the ice clinging to the shore throughout the summer in many instances. When the ice does leave the shore, it is usually so late in the season that vegetation has no chance of existing, if it ever succeeded in establishing itself. I have only seen two spots where maritime plants might be expected, and these were separated from the sea by ice the whole time, excepting one month in 1895. Then the abundance of fresh water which is discharged into the sea at these two places named renders the water too free of saline matter to encourage the growth of maritime plants, supposing they have ever existed there during similar climates to the present.

On the southeastern side of Cape Gertrude there is a flat, sandy, marshy-looking beach only a few feet above the sea. I saw this first in September, 1894. It was then as hard as a road, and there was a little snow on it. It seemed to me a very promising place, so the next summer I went to look for those damp-loving plants which are well-known to grow in latitudes quite as high as this. I was there on Cape Gertrude eight days, so that I had abundance of time to satisfy myself as to the vegetable life. It must be difficult for you to imagine a more desolate waste than this; not a

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single flowering plant—not a leaf of one—and this on the warmest side of the cape. On the southwestern side of this cape I found a small flora, and on the south side, on raised beaches, there are small but beautiful patches of the purple saxifrage.

You will have come to the conclusion by this time that Franz-Josef Archipelago is not a paradise for the lovers of flowers; but we must not take too gloomy a view of this forbidding-looking group of islands. In support of this statement, I must ask you to attend to the cryptogamic flora referred to later in this paper. Before passing to that, I must request you to consider a few remarks on the phænogamia.

There are fourteen common Arctic plants, which find a home here in every possible place for a plant to grow, some of them of considerable beauty when compared with their stern surroundings; others of them do not flourish, but merely exist. Those plants which may be said to succeed the best here are well known among the most Arctic species. I may mention them, as there are not many: *Papaver nudicaule** (yellow and white poppy), *Cardamine bellidifolia*, *Draba alpina*, *Cochlearia fenestrata*, *Cerastium alpinum*, *Saxifraga oppositifolia*, *Alopecurus alpinus*, *Phippsia algida*, and *Poa cenisia*, all vars.

Now I will mention the few plants which are scarce here: *Pleuropogon Sabinii* Br., in one pool only. *Sagina Linnæi* Presl., on Cape Neale only. *Arenaria sulcata* Schlecht, on three capes, but very scarce indeed. *Saxifraga stellaris* L. Poir var. *comosa*. This is small, but looks like existing as long as most of the phænogams in the three spots where it grows. This is a high latitude for the last. *Graphephorum Fisheri*, Gray. *Poa abbreviata* Br.

Cryptogamia

There are no vascular cryptogams. There are as many musci as we can expect, but very few species are fertile. There are lovely carpets of brilliant crimson, yellow, green, and golden mosses on the wet, level, raised beaches. Hepaticæ are poorly represented; the only conspicuous species — *Marchantia polymorpha* — although barren, is luxuriant from sea-level to 500 feet on Capes Flora and Grant, but not elsewhere. Marine algæ are extremely scarce, and very difficult to obtain. I believe I have brought everything that it was possible to procure. The scarcity of open water makes it unusually difficult to procure these forms.

Fresh-water algæ are more plentiful. I devoted much time and labor in collecting, examining, and preserving every species.

Lichens

These are fairly well represented, the most notable absentee being *Dactylina arctica*.

* *P. radicatum* Rottb.

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It is unnecessary to mention any but the most characteristic species. *Placodium elegans* is the one which most attracts the eye, and which gives a warm orange tint to the landscape in some places. Some boulders are almost covered with it, from the present seashore up to 600 feet. Then the cliffs are in many places decorated up to about 1000 feet. Snow melts very soon on boulders when this lichen is present in sunny places.

The next most characteristic species is *Neuropogon melaxanthus*, a pretty and interesting plant. I never saw this on rocks *in situ*. On loose boulders it is abundant up to 900 feet. This plant has a very wide distribution, although it is not found in all Arctic regions.

The *Gyrophora* group, known as *Umbilicaria*, are here in great profusion, but many of the forms which are known in the Arctic do not occur here. One of the species is represented by a handsome variety (*G. Delixi*). These plants also ascend to 900 feet.

Thamnolia vermicularis, Sw., sometimes called macaroni lichen, is conspicuous at all elevations. There are large patches near sea-level, but the finest examples are in damp hollows on the talus at 500 feet. It ascends to 900 feet, but is small and much scarcer. At this elevation it is conspicuous, owing to the great paucity of other plants, the only flowering plant which ascends to that height being *Phippisia algida*, a common Arctic grass. This does not flower, however, above 600 feet. Small tufts of leaves nearly an inch long are found at 900 feet in one place.

Lecidea geographica is the only other lichen which is conspicuous at 900 feet.

Peltigera aphthosa is in profusion at low elevation. This is a very conspicuous plant, having the upper surface of the thallus an apple-green color. There is a handsome variety of this, having its upper parts a fine bronze-green, less easily fractured than the common form. I have not seen this form from any other region. There are other species of this genus, but they are neither conspicuous nor frequent.

I only found the pretty *Solornia crocea* in one spot. It is very small there.

It is sometimes difficult to obtain specimens of the saxicolous lichens, some of which only grow on round, smooth boulders of basalt. I did, however, bring back specimens of them all.

Fungi are fairly well represented by *Hymenomycetes*.

The Protophyta are the most numerous forms. Some mossy pools abound with small organisms of this class, including "red snow," which is very abundant in many places. Of the microscopic forms of this subdivision we now have a very interesting collection of the most Arctic forms. I collected examples in some quantity from many places. Diatoms, though very abundant, are not represented by a great variety of species. Desmids are remarkably scarce.

The above is a revised account of the flora which was published in the *Geographical Journal* in 1896.

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A second short account appeared in the *Geographical Journal* in 1897 on the above subject.

Not any group of plants had then been thoroughly worked out. Quite recently Professor Cleve has published in Stockholm a full account, with illustrations, of some six new species and a few varieties of Diatoms.

I have now finished a long examination of the flowering plants. There is not a single species that is new, and only four forms that have not been described. The most interesting plant is *Pleuropogon Sabinii* Br., because it is the only species here unknown, from Spitzbergen.

Sagina nivalis Fr. and *Saxifraga stellaria* reach their northern limit here.

Several of the species are extremely scarce and local, and much infested with a parasitic fungus. These plants flourish as far north as Advent Bay in Spitzbergen, but specimens from north of 80° in the latter are very similar to those in Franz-Josef Archipelago. The same may be said of plants collected by Kjellman on Kap Tschelyuskin, the most northern point of Siberia. In fact, there is scarcely any difference. It must be remembered that Franz-Josef Archipelago is composed of small islands on and beyond 80° N., so that a few plants which exist on Kap Tschelyuskin and north Spitzbergen may have been on Franz-Josef Archipelago, and have disappeared owing to slightly more unfavorable conditions prevailing there. The absence of the whole group of Corolloflorals from Franz-Josef Archipelago is remarkable.

The presence of seedlings of *Papaver radicum* Rottb.,* *Draba leptopetala* Fr., and *Cochlearia* is interesting, because I do not know of any record of seedlings from such a high latitude.

I have nothing additional to my remarks on the lichens in the "Journal of Geography" for December, 1896. The examination of them is a long and difficult task.

The mosses are still under examination: they promise to be more interesting than I expected.

The fresh-water algæ are almost ready for publication. Some remarkable species are here. One has only been found in the Faroe Isles and another in South Georgia, and some are new. The fungi have several interesting species, one of them being new.

I have previously mentioned Payer's collection, which was made in winter and Mr. Leigh Smith, with Dr. Neale and another, collected some nine flowers. These latter are mentioned by Sir Clement Markham in his account of Mr. Leigh Smith's voyages to Franz-Josef Land.

Professor Cleve also mentions Payer's soundings off Franz-Josef Land in his report (in English) on the Diatoms handed over to him by myself.

A full report is now ready for presentation to the Linnean Society of the flowering plants of Franz-Josef Archipelago.

* The name *P. nudicaule* L. is now applied to a much larger form found in Alpine Central and Eastern Asia.

NOTES ON THE METEOROLOGICAL OBSERVATIONS IN
FRANZ-JOSEF LAND OF THE JACKSON-HARMSWORTH
POLAR EXPEDITION. BY A. B. ARMITAGE

THE following remarks are written with a view to giving some idea of our methods of working, and do not claim to have any special scientific value. I commenced making regular four-hourly meteorological observations after we left Archangel in the *Windward*. They consisted of readings of the barometer, thermometer (for the temperature of both air and water), hygrometers, and hydrometers.

The force and direction of the wind, the proportion and direction of the clouds, their scientific nomenclature, the aspect of the sea in all its varied movements, and any other phenomena were all duly recorded in the books supplied to the expedition by the Meteorological Office, where all meteorological data collected by the expedition are being examined.

For instance, I find noted that on August 17, 1894, in about latitude $70^{\circ} 44'$ N., longitude 52° E., heavy, dark clouds were seen settling down on the eastern horizon, with forked lightning, and low, rumbling thunder. That was the last display (in that particular form) of such disturbances we were to see and hear for some years to come.

There is also recorded on the same date the greatest difference in the specific gravity of the sea-surface, when among the ice, and *vice versa*, which I have seen while in the Arctic seas; the scale-reading in the former case being 12.5° , in the latter, 26° , and the sea-surface temperature $+39^{\circ}$ F.

During the ten weeks which had elapsed between the date of our arrival at Franz-Josef Land and that on which we took up our abode at the hut on Cape Flora, I continued to make my observations on board the *Windward*.

On November 17, 1894, everything, including instruments, was on shore and we proceeded to erect them in suitable positions for observing with during our prolonged stay in this country, which, we all hoped, would yield no small number of its ice-bound secrets.

Our standard barometer was a marine mercurial, loaned to the expedition together with a number of other instruments, through the courtesy of Mr. R. Scott, F.R.S.

It was mounted in our common living-room, close to the S.E. window.

Near it, on our "sideboard," were one large aneroid barometer and three

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small pocket-aneroids, so that the aneroids which we used when travelling were constantly compared with the standard barometer.

Built against the S.W. corner of the hut was a small wooden structure 5 ft. by 4 ft. by 4 ft. in which was mounted the "George's Mercurial Mountain Barometer."

The thermometer screen was erected on the top of a cask, at a suitable distance from the hut, and steadied by bowlders placed round the cask.

In it I mounted the registering thermometers, dry and wet bulb thermometers, and one of the meteorological office sling thermometers.

On the top of a stout pole fixed against the stable, and well above obstructions, was the anemometer, which, I am sorry to say, was worn out by the furious gales which hold their revels in an uncommon degree in that portion of the globe, some time before we left it.

All the readings of these various instruments were recorded day by day, as well as the usual phenomena previously detailed; and any uncommon appearance in the aspect of the weather, the heavens, the earth, or the sea.

During the winter months these observations were made every four hours of the day—viz., 8 A.M. to 8 P.M. inclusive, with the exception of the last year, when only the four-hourly observations were taken.

I generally made all the four-hourly observations myself, with few exceptions; but during winter months, and while on the exploring journeys, the other members of the expedition assisted me.

I read the various instruments, and noted the phenomena from 8 A.M. to 10 P.M., Mr. Jackson being responsible for those at midnight and 2 A.M., while during the first year Dr. Koettlitz, Messrs. Fisher and Child were alternately responsible for the 4 and 6 A.M. readings, and in the winter of the second year Dr. Koettlitz and Mr. Child undertook them.

During the spring journeys, on all of which I accompanied Mr. Jackson, the other members of the expedition kept up the meteorological observations.

When on our boat journey in 1895, Heyward made all the observations at Cape Flora; and Mr. Bruce took charge of the meteorology while we were on a sledge journey of two months' duration in the spring of 1897.

The care and accuracy with which they recorded them is evidence of their interest in the work.

In regard to our observations while travelling, I made them when possible, generally three or four times during the day.

When weather permitted, I placed a small box of registering instruments in a protected place after camping, and recorded the readings on turning out.

The pocket-aneroid barometer had a lively time of it on these occasions, for the weather was seldom similar for many hours together; and on our last spring journey the up-and-down glacier work seemed to

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demoralize it altogether. The thermometers, too, ran up and down the scale in a very energetic manner.

Our lowest registered reading while travelling was -46° F.

At Cape Flora it was -54° F.

There is a +correction of at least $7\frac{1}{2}^{\circ}$ on the -54° F. reading, which would make it $-46\frac{1}{2}^{\circ}$ F.

The maximum reading is fairly correct, merely needing 0.3° to be taken from it.

Most of our instruments were examined and corrected at Kew Observatory, both before we left for the north, and after returning from it. I made regular observations for the rain-band with a direct vision spectroscope during the last year of our stay, and found it chiefly conspicuous by its absence.

All our instruments were, of course, the best that could be procured; but certain improvements are bound to suggest themselves after a long personal experience with them in such a climate.

At least two large thermometer screens (if possible, three) should accompany a polar expedition, together with as many sets of instruments to be mounted in them respectively; for with only one, as I can testify from experience, it is very difficult to keep the screen clear from snow (without injuring or disturbing the instrument), which drives through the smallest crevice, and packs into a solid mass inside.

With more than one screen (they should be easily movable), while one set of thermometers is registering the temperature the other can be thawing out in the hut or ship.

A barograph, and thermograph, too, would add greatly to the meteorological results; and, also, two or three hand-anemometers, as well as a standard one.

The observers on Ben-Nevis could give most valuable information to any expedition which has to work with snow as its constant companion. Perhaps the most interesting and certainly the most beautiful phenomena which we observed in that northern land were the auroral lights. The goddess was not so brilliant as I had preconceived her to be, except on comparatively rare occasions, the generally pale, straw-colored tint of the lights being more appropriate, however, to the simile of the Esquimaux, who call them "the shades of the dead." In Franz-Josef Land the auroral light, as a rule, made its appearance in the east, spreading in more or less arched bands to the westward, either across the zenith or at varying altitudes, with streamers shooting up from the arches towards the zenith, and then gradually fading away. At other times the streamers, meeting at a common point, would form a corona in the zenith and dance madly round the heavens, first one way and then another.

I have seen the arches intercrossing one another all over the heavens, chiefly from east to west. On occasion, of course, we had some very brilliant displays, quite unlike the ordinary ones.

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For instance, I find noted on the 19th of December, 1895: "Aurora all day, in bands and streamers, culminating at 8 P.M. in a brilliant display from east to west, being of spiral, fanlike, and circular shapes. Thick circular masses in west extreme, sending out streamers with rapid, lateral movement to north, which again closed up into bands and moved laterally and rapidly to the southward, and disappeared, appearing to rise as it did so."

I have seen the auroral light extinguish to our vision that of stars below the third magnitude and cast a shadow.

The most brilliant displays generally occurred during calms or, paradoxical though it seems, gales of wind; also shortly before and after winds of great force.

Although I have frequently listened intently for any sound that might have been caused by the aurora, I have never heard any in the slightest degree.

When quite calm, however, the curious noises made by the motion of the ice almost deceived me into the belief that there was some sound emanating from the restless lights overhead, but it was not so.

I have stood outside the house and watched one of the grandest sights which nature has ever unfolded before the eyes of man (and I have seen many in diverse portions of the globe). It was what seemed to be a stupendous battle between the aurora and the wind.

The former would struggle up against the latter until it formed a semi-corona in the zenith, and appeared to struggle against the furious gusts of wind (which are so prevalent in Franz-Josef Land) for some minutes, sending streamers out against the enemy, and then, finally being vanquished, gradually retreat before his repeated onslaughts to the place from whence it came.

The aurora had a marked effect upon the needle which I kept suspended in the magnetic observatory.

Before we left England, a galley which was being supplied to the *Windward* was entirely fitted with brass.

On arriving at Franz-Josef Land we found that the observatory which had been built for the expedition was entirely unsuited for a boisterous climate.

Then the galley, brass-fitted, double-walled, lined with felt, and about six feet square, came in very usefully as an observatory. Trap windows were cut in it; and on December 4, 1894, it was landed and placed in a suitable position, its sides being north, south, east, and west.

In it I have spent many hours, and could, by a rather elastic stretch of my imagination, fancy myself once again in the magnetic-house at Kew.

I found the needle very erratic at times, especially when making the observations of vibration, deflection, and declination.

The last named varied nearly 6° . During the observations of declination the needle was much steadier.

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Very great inconvenience was caused, both while working with the unifilar magnetometer and dip-circle, by the freezing of my breath on the glasses of the instruments, until I devised means of heating the observatory. A small copper oil-lamp of great heating power would be most useful in such cases; and the house should be well warmed and dried before observing in it.

A small lamp of non-magnetic material, placed on the reading telescope during the deflection observations, and opposite the unifilar when making observations of vibration and declination, is also necessary.

The observations of declination which I made on our journeys were fairly regular, although the cliffs, when very close to or on top of them, as well as occasional magnetic disturbances, sometimes affected the needle.

Marks for north and south I laid down by means of the theodolite and unifilar magnetometer.

For the purpose of observing for position we were equipped with a six-inch transit theodolite, three aluminium sextants, and artificial horizons.

Our time-keepers consisted of one chronometer and four half-chronometer watches.

The chronometer was slung in the usual padded box, made under my personal direction. The chronometer kept capital time the whole three years.

The watch which I wore on my person behaved beautifully throughout notwithstanding the rough travelling over the ice, crossing of glaciers, and immersion in water which, in common with its bearer, it had to undergo.

The position of "Elmwood," our base, from which were determined all meridian distances, was made by lunar distances, moon-culminating stars, meridian, and circum-meridian altitudes of stars.

I can confidently recommend any one who aspires to quickness in observing to practice in a temperature of -30° F., with a light to moderate breeze blowing.

All instruments should have their eye-pieces fitted so as to keep the mouth and nostrils as far away as possible from the verniers.

The theodolite requires a lamp with a cistern that will contain enough oil to last an hour, well ventilated, and not liable to blow out at every little puff of wind.

On our journeys I had to use a sextant and artificial horizon. I cannot recommend aluminium for sextants up north.

A small theodolite would have been much better, for it is intensely aggravating to see a bright sun too low to use an artificial horizon, and not a vestige of any other.

It is poor business, too, using mercury in really low temperatures, to say nothing of the weight.

Difficulty, however, in observing, as well as in other things, but enhances the interest one may take in such work, by the pleasure that is felt in over-

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coming it, especially when helping, in however small a degree, to enlarge our knowledge of the world we live in.

When approaching Franz-Josef Land the difference between the position by observation and that by dead-reckoning during forty-eight hours showed a current running southwest two knots per hour.

SOME RESULTS OF METEOROLOGICAL OBSERVATIONS
MADE AT CAPE FLORA, FRANZ-JOSEF LAND. BY MR
STRACHAN. METEOROLOGICAL OFFICE, LONDON.

AT Cape Flora the sun sets for the last time about the middle of October, and is not again visible until the third week of February. From the date of the disappearance of the sun until the second week of November there is a period of two or three hours' twilight about noon. From November to February mid-day and midnight are practically alike as regards light.

The climate generally is exceedingly misty. Snow-storms are very prevalent, and gales of wind are of continuous occurrence. The highest temperature at any time during the year was 42° , and the lowest experienced was 46° below zero.

Although the station has high land between northwest and northeast the winds observed even from that quarter are regarded as reliable, as their direction as well as force were observed with special care. The true direction (not magnetic) was recorded.

The absence of winds from the southward, the azimuth, which was quite open to the ocean, is remarkable. The frequency of winds from the eastward and westward, with tendency northward, as well as their violence are probably due to some extent to the configuration of the archipelago.

Gales and squalls of wind prevailed for days together and were often of extraordinary violence. They raised the snow so as to obscure all vision so that at times it was impossible to say whether snow was actually falling or not. Doubtless some record of snowfall was thus lost. In the months when night observations were not taken it was not always practicable to record the duration of snowfall in the interval; the hours of snowing are accordingly defective, and were actually greater than shown by the record. Some snow fell even in the height of summer about as often as rain. The duration of the rain has been counted with that of snow, though the frequencies are distinguished.

Openings in the ice, brought about by the tides, currents, and winds gave rise to frost smokes and mists, as well as the formation of stratus clouds. Hence the frequent record of this phenomenon.

Table I. contains the mean values of atmospherical pressure. The diurnal range is shown to be very small, as for all parts of the Arctic region but the observations are only sufficient to detect it at Cape Flora for the

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months of November, December, January, and February. One minimum and one maximum only are indicated for December and January; a secondary minimum and a secondary maximum are apparent in November and in February. The hours of these positions are very irregular. In December, 1894, the barometer averaged only 29.40 inches, but in the following February as much as 30.16.

Table II. gives the mean temperature of the air for the hours of observation. The diurnal range is only completely exhibited for the "coldest months. In February, 1895, there was practically no diurnal range of temperature, and in other months it is merely two or three degrees. The coldest month was February, 1895, with a mean of minus 20.6°, though January, 1896, was nearly as cold, minus 19.6°. The warmest month was July, 1895, with a mean of 35°.

Table III. shows the greatest and least atmospherical pressure in each month, with the simultaneous temperature, wind, and weather. The weather was uniformly clear and fine with the highest pressure, misty or snowy and windy with the lowest. The unprecedented pressure for any oceanic station, 31.23 inches, occurred in February, 1895, and the lowest observed was 28.16 inches in the previous December, showing a total range of the mercurial column of 3.07 inches. The atmospherical pressure exceeded 31 inches from before noon February 5th till nearly 10 A.M. of the 6th.

Table IV. shows the highest and lowest readings of the thermometer in each month, with the simultaneous observations of atmospherical pressure, wind, and weather. The highest temperature, 41.8°, occurred in July; the lowest, 45.5° below zero, in February, giving a range of temperature within the year 1895 of 87.3°. The highest temperatures were accompanied by overcast, misty, or snowy weather, except in summer, when the weather was clear with them. Conversely, the lowest temperatures occurred in very clear weather, except during summer, when the weather was misty or overcast. The monthly range of temperature exceeded 60° in February, and was only about 12° in July.

The barometrical observations have been corrected for instrumental errors, reduced to temperature 32°, and to the sea-level. The thermometrical results have been corrected for instrumental errors, as determined at the Kew Observatory.

The range of temperature was 87.3°; in November, December, January, and February it averaged 53°; March, April, and May, 39°; June, July, and August, 14°; September and October, 31°. Thus the range of temperature is greatest in winter, least in summer.

The northern auroral lights were, especially in the winter, often of extraordinary splendor, and the phenomenon was constantly a subject of attentive observation. Careful descriptions of the displays were recorded, and the narrative will form an important part of the scientific work of the expedition.

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The extraordinary atmospherical pressure in February, 1895, gave the highest readings of the barometer ever experienced by British observers in any part of the world, though higher have been recorded in Russian Siberia, if their reductions to sea-level are reliable. There could be no mistake about those at Cape Flora, for they were confirmed by simultaneous readings of an auxiliary mercurial barometer and two good aneroids.

The detailed results of the meteorological observations will be given in the publication of the scientific work of the expedition. The observations made during the sledge journeys will then also be printed.

Table V. is a summary for each month of the winds referred to sixteen points for direction, with their mean force by Beaufort's scale, 0 being calm, and the grades rising by units to 12, representing the most violent hurricane.

Table VI. is a summary for each month of the weather from the record kept in the Beaufort notations, together with the duration of snow, including rain, if any, in hours.

Table VII. is a summary for each month of the kinds of clouds recorded, together with the monthly mean amount of cloud, by the scale 0 to 10, a cloudless sky being represented by 0, a sky entirely overcast by 10, the intervening figures being proportional amounts of cloud.

The contents of tables V., VI., and VII. will be illustrated by the following concise account of the characteristics of the weather of each month:

September, 1894.—The first decade of this month was spent in the vicinity of the south coast of Franz-Josef Land, seeking for an eligible spot for the station. It was late in the season for navigation. The mean temperature of the air was only 19° , that of the sea-surface water averaged 28.7° , and its specific gravity 1.0235. The winds were chiefly from N.E. to E., and frequent from N.W. The weather was generally overcast, and 112 hours of snowfall were counted.

October, 1894, had a mean temperature one degree below zero, with prevalent winds between N. and E., moderate to strong, with frequent squalls. The weather was for the most part clear, and only $58\frac{1}{2}$ hours of snow were recorded.

November, 1894, had about the same mean temperature as October, but the range of the thermometer was greater, and of the barometer also. There was more variation in the winds, but still chiefly between N.E. and E. There were fewer squalls, fairly clear weather, but 128 hours of snow.

December, 1894, had low mean atmospherical pressure, 29.4 inches. The mean temperature was minus 17° . The winds were mostly logged under W.N.W., N.W., N., N.E., and E. Squalls were frequent. The mean amount of cloud was only 4.4, and clear weather predominated, though there were 92 hours of snow.

January, 1895, had a mean temperature of minus 11.6° , though a large range. The most wind came from N.E. and E.S.E., moderate. Clear weather predominated, though there were $129\frac{1}{2}$ hours of snow.

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February, 1895, the atmospherical pressure averaged 30.16 inches, and attained the remarkable height of 31.23. The mean temperature was the lowest of any month, minus 20.6°, with the largest range 62°, and the lowest observed temperature, minus 45.5°. With these extreme conditions the winds were chiefly from E. and N.W., the air was very clear, mean amount of cloud 3.6, and only 33 hours of snow.

March, 1895, had a mean temperature about minus 15°, a range of only 38°, a small range of the barometer, a prevalence of calms. The air was generally clear, the mean amount of cloud only 5.1, and 40 hours of snow.

April, 1895, the temperature was now rapidly rising, the mean being minus 1.5°. The winds and weather became more variable, with a good deal of mist, and snow during 70 hours.

May, 1895, atmospherical pressure was getting less, and the temperature higher. The mean temperature was about 17°, the range had fallen to 28°, and was never below zero. Winds came from all directions, and there were frequent squalls. The weather was mostly overcast, with much mist, and snow for 79 hours.

June, 1895, atmospherical pressure continued to decrease, and temperature to increase. The mean temperature was 32.4°, with a range of only 13°. The chief winds were from W.N.W. and N.W. This was the most foggy month. The weather was mostly overcast, misty, and there were 89½ hours of snow. The amount of cloud, 8.9, was the largest.

July, 1895, had low atmospherical pressure, was the warmest month, with a mean temperature of 35°, and small range. The winds were variable and calms were frequent. Mist was very prevalent, and the sky was commonly overcast. Snow was more frequent than rain, and the hours of their duration were 46.

August, 1895, witnessed a decrease in temperature, the mean being at or about the freezing-point. The winds were most frequent from the N.E. quadrant. The weather was overcast for the most part, with a good deal of mist. Snow was more frequent than rain, and the hours of their duration were 65½. Cumulus clouds were noted on 19 occasions.

September, 1895, had low atmospherical pressure, mean temperature 24°. The most frequent winds were from E.N.E. The sky was commonly overcast, and a good deal of mist prevailed. Rain was noted 7 times, snow 24, and their duration was 67 hours.

October, 1895, had a mean temperature of 7.3°. The winds were chiefly from eastward. The weather was much clearer than it had lately been, but fog was rather frequent, though only 34 hours of snow were noted.

November, 1895, had low atmospherical pressure, mean temperature minus 7.8°, with large range in both these elements. The winds came chiefly from the N.W. and E.; calms were rather frequent. Much clear blue sky was experienced, and only 45 hours of snow.

December, 1895, had low atmospherical pressure, and was a trifle warmer

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than November, though with a great range of temperature. The winds were chiefly from N.E. and E. Calms were frequent. The sky was even clearer than in November, though 133 hours of snow were counted, and much mist prevailed. Squalls became rather frequent.

January, 1896, had very low atmospherical pressure, with a large range. The mean temperature was 19.6° below zero. The winds were chiefly from the eastward and from N.N.W., fresh. Although the weather was excessively squally, much mist prevailed, and snow during 88 hours.

February, 1896, the range of the barometer and also of the thermometer were almost at their greatest extent. Atmospherical pressure was at the lowest, mean 29.39 inches. The mean temperature was 7.5° below zero. This month was in striking contrast with the previous February, when the pressure was greatest and the air coldest. The winds predominated from eastward. The amount of cloud was moderate, but there was much mist and snowing was reckoned at 89 hours.

March, 1896, had high atmospherical pressure, and was comparatively warm with mean temperature 8.8° , though the range was large. Calms were frequent, and the principal winds from eastward. The weather was for the most part overcast, misty, with much snow during 60 hours.

April, 1896, was comparatively warm, with mean temperature 9.9° . The winds were chiefly from eastward. There was much clear sky, though the hours of snow numbered 122.

May, 1896, had about the same mean temperature, 16.6° , as the previous May. The wind favored all points of the compass. There was a good deal of overcast, misty weather, and snow fell during $78\frac{1}{2}$ hours. Rain was noted 5 times, snow 23.

June, 1896, had mean temperature 30.3° , and the range was small. The winds were variable and squally. Rain was noted 6 times, snow 12, and their duration was 38 hours. This month had the most cumulus and cirrus clouds.

July, 1896, had mean temperature 33.6° , with a smaller range than any other month. The winds favored all points of the compass. The weather was for the most part overcast and misty. Fog was noted 5 times. Rain was noted 11 times, snow 10, and their duration amounted to 47 hours.

August, 1896, had mean temperature 32° . The most frequent winds were from E.S.E., but they varied over the compass with occasional calms. The weather was often overcast and misty. Rain was noted 9 times, snow 14, and their duration amounted to $37\frac{1}{2}$ hours.

September, 1896, had mean temperature 26.3° . The winds were principally from northward, though they varied over the compass. The weather was mostly overcast, the amount of cloud being 8.8. Fog was noted once, rain was noted once, snow 25 times, and their duration amounted to 46 hours.

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Hours	1864					1865				
	Sept.	October	Nov.	Dec.	January	February	March	April	May	June
2 A.M.	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
4 "	29.857	29.736	29.761	29.411	29.845	30.150	—	—	—	—
6 "	—	—	—	.413	.866	.166	—	—	—	—
8 "	.873	.745	.764	.402	.865	.165	—	—	—	—
10 "	—	—	—	.389	.864	.160	30.027	29.875	29.725	29.697
Noon	.874	.745	.772	.382	.872	.160	.045	.807	.727	.713
2 P.M.	—	—	—	.389	.880	.171	—	—	—	—
4 "	.867	.727	—	.392	.875	.172	.042	.902	.734	.686
6 "	—	—	.770	.412	.873	.165	—	—	—	—
8 "	.856	.734	.779	.418	.861	.103	.040	.912	.736	.706
10 "	—	—	—	.423	.858	.159	—	—	—	—
Midnight	.862	.745	.785	.418	.846	.147	—	—	—	—
Means	29.865	29.739	29.772	29.404	29.865	30.162	—	—	—	—

Hours	1865					1866				
	October	Nov.	Dec.	January	Feb.	Feb. 1 to 18	March	April	May	June
2 A.M.	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
4 "	—	29.613	29.682	29.456	—	29.445	—	—	—	—
6 "	—	.606	.683	.452	—	.433	—	—	—	—
8 "	—	.597	.679	.448	—	.412	—	—	—	—
10 "	29.870	.595	.681	.444	29.370	—	30.049	29.934	29.890	29.887
Noon	.895	.601	.684	.451	—	.369	.067	.951	.902	.896
2 P.M.	—	.610	.690	.458	.380	—	—	—	—	—
4 "	.890	.615	.695	.463	—	.373	.070	.948	.894	.893
6 "	—	.610	.694	.468	.399	—	—	—	—	—
8 "	.890	.608	.689	.471	—	.384	.066	.943	.881	.900
10 "	—	.608	.685	.470	.401	—	—	—	—	—
Midnight	—	.612	.683	.473	—	.390	—	—	—	—
Means	—	.613	.686	.471	—	.386	—	—	—	—

Aneroid † 573 used till November 22d, when the barometer showed it to be practically correct. July, 1866, no observations 26th and 27th. August, 1866, only thirteen observations at 8 A.M., value obtained by differences.

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TABLE II.—MONTHLY MEAN TEMPERATURES OF THE AIR AT CAPE FLORA, FRANZ-JOSEF LAND

Hours	1894				1895								
	Sept.	October	Nov.	Dec.	January	Feb.	March	April	May	June	July	August	September
2 A.M.	—	—	—	—17.8	—11.7	—20.5	—	—	—	—	—	—	—
4 "	17.9	—1.9	—1.2	—17.2	—12.7	—20.7	—	—	—	—	—	—	—
6 "	—	—	—	—17.1	—13.2	—20.9	—	—	—	—	—	—	—
8 "	19.5	—1.6	—1.3	—16.7	—13.0	—20.5	—14.6	—2.0	16.2	32.1	34.5	32.9	23.8
10 "	—	—	—	—16.4	—12.6	—20.3	—	—	—	—	—	—	—
Noon	20.0	—1.3	—1.1	—15.8	—12.0	—20.5	—14.0	—0.4	17.7	32.6	35.3	33.4	24.5
2 P.M.	—	—	—	—15.3	—11.4	—20.5	—	—	—	—	—	—	—
4 "	20.1	—1.1	—0.3	—16.0	—10.9	—20.7	—15.2	—1.1	17.2	32.5	35.9	32.7	24.2
6 "	—	—	—	—16.5	—10.3	—20.7	—	—	—	—	—	—	—
8 "	19.6	—1.3	—0.7	—17.0	—9.9	—20.6	—16.3	—2.7	16.2	32.1	34.3	32.5	23.3
10 "	—	—	—	—17.7	—10.7	—20.8	—	—	—	—	—	—	—
Midnight	18.6	—0.8	—1.3	—17.9	—10.6	—20.4	—	—	—	—	—	—	—
Means	19.3	—1.3	—1.0	—16.8	—11.6	—20.6	—	—	—	—	—	—	—

Hours	1895				1896							Feb. 1 to 18	
	October	Nov.	Dec.	January	February	March	April	May	June	July	August	Sept.	
2 A.M.	—	—8.0	—6.7	—19.6	—	—	—	—	—	—	—	—	—
4 "	—	—7.7	—6.0	—20.0	—	—	—	—	—	—	—	—	—11.7
6 "	—	—7.7	—6.2	—20.2	—	—	—	—	—	—	—	—	—12.3
8 "	7.4	—7.2	—7.2	—19.3	—7.3	7.6	8.5	15.2	30.0	33.8	31.7	26.2	—12.0
10 "	—	—7.6	—7.0	—19.1	—7.0	9.2	10.7	16.9	30.6	34.1	32.7	26.6	—11.5
Noon	7.6	—7.7	—6.6	—18.9	—7.0	9.2	10.9	17.8	30.9	33.8	32.2	26.7	—10.0
2 P.M.	7.4	—7.6	—6.1	—19.3	—8.7	9.3	10.9	16.7	29.9	32.9	31.2	25.9	—10.9
4 "	—	—7.4	—6.1	—20.0	—	—	—	—	—	—	—	—	—11.8
6 "	7.0	—7.9	—6.1	—19.8	—7.0	8.9	9.4	—	—	—	—	—	—11.3
8 "	—	—8.4	—6.2	—19.3	—	—	—	—	—	—	—	—	—
10 "	—	—8.8	—6.6	—19.6	—	—	—	—	—	—	—	—	—
Midnight	—	—	—	—	—	—	—	—	—	—	—	—	—
Means	—	—7.8	—6.4	—19.6	—	—	—	—	—	—	—	—	—

November 1894, the thermometer not illuminated and to with bulb in, when it was placed in a screen twelve yards from the house, and five feet above the ground for 4 feet

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TABLE III.—EXTREMES OF ATMOSPHERIC PRESSURE, WITH ACCOMPANYING TEMPERATURE, WIND, AND WEATHER,
AT CAPE FLORA, FRANZ-JOSEF LAND

Month	Date	Highest	Temp.	Wind	Weather	Date	Lowest	Temp.	Wind	Weather	Range
	d. h.	Inches	°			d. h.	Inches	°			Inch
September, 1894.	25 M	30.50	4.8	ESE 2	bc	15 8	29.05	21.1	Ebs 9	s	1.45
October, "	8 N	30.32	4.6	E 1	bc	27 M	29.26	0.6	NE 9	bcq	1.06
November, "	16 N	30.40	15.3	SSW 2	o	24 2	28.73	?	ESE 2	s	1.67
December, "	— 16	30.15	— 7.8	E 4	b	21 2	28.16	14.8	SW 2	s	1.99
January, 1895.	20 8	30.47	— 26.8	E 1	b	14 2	28.97	5.1	NE 7	ms	1.50
February, "	5 M	31.23	— 5.2	NNW 2	bv	27 16	29.43	— 23.8	NNE 9	b	1.80
March, "	9 N	30.54	— 9.2	Calm	b	13 20	29.57	— 20.7	NWhN 3	cm	0.97
April, "	10 N	30.43	— 6.0	SE 3	bv	23 20	28.80	5.5	NE 6	ms	1.63
May, "	16 N	30.08	19.2	NE 6	bv	20 8	28.93	24.6	Calm	ms	1.15
June, "	18 4	30.31	34.1	NW 5	bc	7 20	29.32	33.3	ESE 3	sf	0.99
July, "	10 4	30.05	37.3	Calm	bc	29 4	28.95	33.1	NbW 6	cbm	1.10
August, "	14 N	30.37	35.1	SW 1	o	30 20	29.18	35.3	NE 6	mr	1.19
September, "	25 4	29.97	5.5	ESE 3	ms	19 20	29.22	23.1	N 7	msq	0.75
October, "	26 N	30.49	10.4	E 4	cbm	29 8	29.27	— 1.3	NNW 4	bcm	1.22
November, "	25 8	30.34	— 1.3	NE 5	bv	29 6	28.92	— 6.2	NEN 4	ms	1.42
December, "	26 2	30.33	— 18.1	Calm	bv	10 4	28.91	12.9	NNE 5	msq	1.42
January, 1896.	27 22	30.20	— 18.0	NW 1	o	6 20	28.39	— 12.0	ENE 8	msq	1.81
February, "	20 8	30.21	— 25.8	Calm	bc	2 N	28.25	18.2	SSE 5	ms	1.96
March, "	10 N	30.65	20.2	SSW 1	cbm	24 8	29.56	— 4.3	E 7	m	0.99
April, "	19 N	30.22	1.0	E 3	bv	8 20	29.40	19.1	ESE 7	m	0.82
May, "	1 8	30.35	1.0	ESE 2	o	29 8	28.85	28.5	NNW 4	ms	1.50
June, "	14 N	30.10	32.2	SSE 2	bv	1 4	28.87	30.0	WSW 2	o	1.23
July, "	8 4	30.22	32.0	S 1	cbm	22 8	29.24	31.5	SE 4	md	0.98
August, "	28 N	30.23	36.5	NW 1	cbv	4 8	29.11	31.0	S 2	mr	1.12
September, "	24 N	30.19	32.5	N 1	cb	30 8	29.07	33.0	Ebs 3	m	1.12
Period . . .	Feb.	31.23	—	—	—	Dec.	28.16	—	—	—	3.07

The barometer was above thirty-one inches from before noon February 5th till near 10 A.M. 6th, 1895.

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TABLE IV.—EXTREMES OF AIR TEMPERATURE, WITH ACCOMPANYING PRESSURE, WIND, AND WEATHER, AT
CAPE FLORA, FRANZ-JOSEF LAND

Month	Date	Max.	Bar.	Wind	Weather	Date	Min.	Bar.	Wind	Weather	Range
	d. h.	°	Inches			d. h.	°	Inches			°
September, 1894.	4 N	34.4	30.12	NE 1	o	29 16	0.6	30.00	E 1	om	33.8
October,	3 N	19.0	29.38	ENE 6	ms	12 4	-11.9	29.60	N 9	bcq	30.9
November,	20 8	35.0	29.52	W 1	md	11 16	-25.8	29.78	NE 5	bc	60.8
December,	21 2	14.8	28.16	SW 2	s	29 16	-36.6	29.46	N 5	b	51.4
January, 1895.	10 M	26.1	29.73	NbW 2	o	21 10	-30.5	30.18	ESE 2	b	56.6
February,	6 20	16.3	30.50	Calm	s	20 10	-45.5	29.99	Calm	b	61.8
March,	31 4	7.5	29.69	ESE 2	ms	15 8	-30.5	29.85	SE 1	b	38.0
April,	29 N	25.3	29.64	SW 1	ms	7 20	-13.6	30.26	ESE 4	b	38.9
May,	2 N	32.6	29.53	WbN 2	m	6 8	4.6	29.66	ESE 2	ms	28.0
June,	30 8	37.0	29.67	NNW 2	b	1 8	24.0	30.03	WNW 3	c	13.0
July,	23 4	41.8	29.76	SSE 1	b	24 8	28.8	29.78	Calm	m	13.0
August,	4 20	41.2	30.07	NNE 4	bc	28 N	25.0	29.53	ENE 4	bc	16.2
September,	9 8	40.6	29.71	ENE 4	o	25 8	3.6	29.96	ESE 3	m	37.0
October,	8 8	22.9	30.17	SE 2	m	2 20	-13.1	29.66	NW 4	b	36.0
November,	1 8	13.9	29.29	NbE 2	s	23 4	-27.0	29.71	Ebs 6	b	40.9
December,	11 8	15.3	29.13	E 4	s	31 6	-35.6	29.54	NW 2	b	50.9
January, 1896.	18 2	6.5	29.75	E 6	s	13 8	-39.5	29.49	Calm	b	46.0
February,	27 8	30.3	28.90	SW 6	ms	19 8	-29.7	29.63	NNW 4	b	60.0
March,	8 20	29.1	30.30	Calm	m	— 20	-23.9	29.86	NW 1	b	53.0
April,	9 4	29.1	29.57	SW 2	ms	7 8	- 8.0	30.01	F 5	cbm	37.1
May,	26 8	33.0	29.44	SE 5	ms	20 8	- 4.0	29.98	W 4	bcq	37.0
June,	12 8	40.0	30.07	NW 1	bv	5 20	23.0	29.91	NW 2	m	17.0
July,	13 N	40.0	29.84	NE 5	cbq	17 8	20.0	29.92	WNW 3	m	11.0
August,	26 4	40.0	30.18	N 1	bc	12 8	26.0	29.93	Ebs 6	bc	14.0
September,	30 8	33.0	29.08	Ebs 3	m	19 8	17.0	29.95	ESE 1	c	16.0
Period	July	44.8	—	—	—	Feb.	-45.5	—	—	—	87.3

APPENDIX

TABLE V.—SUMMARY OF WEATHER NOTATIONS AT CAPE FLORA,
FRANZ-JOSEF LAND

Month	No. of Observa- tions	b	c	o	m	f	r	s	Hours of Snow	q
1894										
September .	180	26	44	110	22	—	—	46	112	6
October . .	186	71	62	53	32	3	—	19	58½	51
November .	180	71	22	87	8	—	—	36	128	13
December .	372	220	64	88	41	—	—	54	92	56
1895										
January . .	372	200	46	126	39	—	—	74	129½	11
February .	336	227	40	69	29	—	—	23	33	31
March . .	124	90	18	16	20	—	—	13	40	11
April . .	120	55	22	43	48	3	—	19	70	10
May . . .	124	33	33	58	40	—	—	29	79	21
June . . .	120	9	25	86	38	18	3	23	89½	5
July . . .	124	17	29	78	69	3	8	10	46	11
August . .	124	11	26	87	53	3	10	16	65½	13
September .	120	12	25	83	51	2	7	24	67	15
October . .	124	25	30	69	48	8	—	17	34	13
November .	360	173	53	134	92	—	—	35	45	13
December .	372	150	54	168	163	—	—	108	133	37
1896										
January . .	372	126	74	172	198	—	—	63	88	87
February .	260	97	55	108	129	—	—	62	89	37
March . .	124	16	21	87	91	—	—	47	60	1
April . .	120	42	17	61	66	—	—	31	122	9
May . . .	124	25	24	75	64	—	5	23	78½	6
June . . .	120	20	39	61	59	1	6	12	38	32
July . . .	120	12	18	90	78	5	11	10	47	7
August . .	124	8	32	84	53	—	9	14	37½	5
September .	120	4	39	77	25	1	1	25	46	4

Many hours of snow were not recorded in October, 1895.

February 26, 1896, mid-day, hail for one hour and a half, size ●, included with snow.

Durations of snow frequently went unrecorded in March, June, July, and August, 1896.

July 26, 1896, no observations.

The duration of rain is summed up with that of snow. •

A THOUSAND DAYS IN THE ARCTIC

TABLE VI. — SUMMARY OF WINDS, REFERRED TO SIXTEEN POINTS.

Month	N		NNE		NE		ENE		E		ESE		SE		SSE	
	O	F	O	F	O	F	O	F	O	F	O	F	O	F	O	F
1894																
September.	30	4.7	6	6.5	18	3.0	5	3.8	20	2.4	4	3.5	8	2.0	1	1.0
October .	18	4.6	19	5.5	59	5.9	13	3.5	28	2.3	3	6.7	12	3.0	—	—
November.	18	3.1	1	2.0	30	4.0	32	4.3	26	3.7	9	3.9	8	4.9	3	3.3
December.	50	3.6	11	4.0	36	4.0	26	4.0	66	4.2	2	2.0	1	1.0	—	—
1895																
January .	23	3.0	14	3.4	55	4.5	13	2.7	59	3.7	48	3.2	19	1.8	—	—
February .	17	2.1	25	6.2	31	3.4	15	3.7	41	3.7	31	2.8	6	2.0	—	—
March . .	4	2.5	3	4.0	8	4.5	8	3.0	7	3.1	10	3.5	7	2.6	—	—
April . .	5	4.0	6	5.7	11	4.6	6	4.3	14	5.1	16	2.9	3	1.7	2	2.7
May . .	8	5.0	2	3.5	8	4.5	3	2.0	17	2.5	7	4.9	3	2.7	2	2.5
June . .	8	2.9	3	3.0	3	2.0	—	—	4	2.0	16	2.6	6	1.8	—	—
July . .	3	4.0	6	4.2	1	4.0	2	5.0	5	3.4	6	1.2	4	2.0	2	1.5
August . .	1	1.0	10	4.0	6	5.2	14	3.1	8	1.8	17	4.0	5	2.2	2	2.3
September.	11	5.8	5	3.8	6	4.2	32	3.1	5	2.4	5	2.2	4	2.2	—	—
October .	2	3.0	3	5.0	3	6.3	24	3.8	35	5.3	3	6.0	1	2.0	—	—
November.	22	3.3	17	3.4	26	4.0	19	5.8	76	6.4	20	5.0	9	2.6	—	—
December.	14	3.0	12	4.5	44	5.7	19	5.3	71	4.6	55	3.8	11	3.8	4	2.0
1896																
January .	24	5.9	17	4.8	38	4.3	11	3.7	52	6.0	61	4.9	6	3.0	—	—
February .	17	3.4	20	4.2	34	4.6	14	4.0	44	5.0	35	4.5	7	5.4	6	3.3
March . .	4	1.0	2	3.5	2	2.5	2	4.0	24	4.3	21	4.6	14	2.7	6	2.7
April . .	—	—	1	2.0	8	5.1	13	4.9	36	4.4	26	5.1	13	2.1	1	1.1
May . .	1	4.0	2	4.5	4	5.7	6	3.7	14	3.1	12	3.0	8	3.2	3	2.2
June . .	7	4.9	2	6.5	9	4.6	—	—	12	3.1	6	2.2	10	3.2	5	1.4
July . .	6	2.7	1	2.0	7	5.4	2	2.5	14	3.4	15	3.5	10	2.0	2	1.5
August . .	8	2.4	—	—	6	3.2	1	1.0	6	3.5	26	3.2	10	1.9	5	1.5
September.	11	2.4	4	1.8	10	2.5	2	2.0	10	3.2	13	3.6	3	2.7	2	2.5
October .	3	4.0	—	—	1	4.0	5	3.2	5	3.0	6	3.0	—	—	—	—

APPENDIX

WITH MEAN FORCE (SCALE 0-12), AT CAPE FLORA, FRANZ-JOSEF LAND

S		SSW		SW		WSW		W		WNW		NW		NNW		No. of Calms	No. of Observations
O	F	O	F	O	F	O	F	O	F	O	F	O	F	O	F		
10	2.7	6	3.0	8	3.6	7	3.1	9	3.2	9	2.4	20	3.1	9	2.1	10	180
2	3.5	—	—	6	1.3	1	1.0	1	7.0	—	—	2	6.5	5	6.2	17	186
3	1.7	2	3.0	3	1.3	—	—	14	2.2	1	6.0	13	4.4	5	2.0	12	180
2	1.5	—	—	2	3.0	1	1.0	12	2.8	47	4.3	58	3.6	13	3.1	45	372
2	1.5	1	2.0	7	2.0	5	1.4	20	1.6	8	2.1	21	2.9	24	3.5	53	372
—	—	—	—	3	1.7	—	—	9	5.1	13	2.5	34	3.2	22	2.4	89	336
1	2.0	—	—	1	1.0	2	1.5	3	2.7	6	4.0	9	3.3	2	4.5	53	124
4	1.0	1	1.0	5	1.0	2	2.0	4	1.8	3	2.7	2	2.0	3	4.3	33	120
1	1.0	3	1.3	5	1.4	5	4.4	6	2.0	6	3.3	11	3.6	23	4.0	14	124
1	1.0	4	1.5	4	1.5	—	—	2	4.5	26	2.4	22	3.6	13	2.8	8	120
—	—	2	2.0	1	1.0	3	2.3	6	2.2	12	2.0	14	3.1	7	3.0	50	124
1	1.0	2	1.5	1	1.0	5	3.0	10	2.5	9	2.1	6	1.8	2	1.0	25	124
5	1.8	—	—	4	2.7	2	3.5	6	3.0	4	4.0	7	5.0	5	5.4	19	120
—	—	—	—	2	1.0	—	—	4	2.5	9	3.4	17	3.9	11	3.9	10	124
—	—	—	—	—	—	1	2.0	9	1.6	11	2.9	42	4.7	37	4.5	71	360
—	—	1	1.0	—	—	—	—	6	2.0	6	2.7	16	2.2	29	3.0	84	372
1	1.0	—	—	7	5.3	—	—	8	2.6	14	5.7	27	6.2	45	6.0	61	372
8	2.1	4	2.2	3	3.3	1	5.0	2	3.0	5	4.4	14	5.4	20	3.6	26	260
4	2.0	1	1.0	3	1.3	1	2.0	7	2.6	5	2.2	1	1.0	1	1.0	26	124
3	2.3	3	1.3	—	—	1	2.0	4	1.2	2	3.0	3	1.0	2	2.0	4	120
3	1.7	1	1.0	3	1.3	4	1.7	15	3.0	13	2.8	16	2.4	10	2.3	9	124
3	1.0	2	1.5	5	1.0	4	2.5	15	3.2	8	2.8	20	2.9	5	3.8	4	120
4	3.7	2	1.5	6	1.5	2	1.0	10	2.1	19	2.3	14	2.7	9	3.0	1	124
6	2.2	1	2.0	1	1.0	2	3.5	7	3.9	5	2.8	17	1.8	12	3.1	11	124
4	1.0	2	2.0	1	1.0	1	1.0	3	1.7	13	2.1	18	3.4	10	3.6	13	120
—	—	—	—	1	2.0	—	—	2	3.0	2	4.5	6	3.7	1	6.0	—	32

A THOUSAND DAYS IN THE ARCTIC

TABLE VII.—SUMMARY OF CLOUD NOTATIONS AT CAPE FLORA,
FRANZ-JOSEF LAND

Month	Mean Amount	Cir.	ψ Cl.	ψ Cl.	Cum.	Cum.-s.	Str.	Nim.	Nil.	N ^o . of Obs.
1894										
September . .	8.1	2	2	20	15	31	84	23	3	150
October . . .	5.8	2	16	50	4	6	93	11	4	166
November . .	6.4	2	8	14	7	7	106	28	8	180
December . .	4.4	1	5	41	15	6	189	47	68	372
1895										
January . . .	5.1	6	9	39	11	12	168	72	55	372
February . .	3.6	3	7	81	8	16	109	21	91	336
March . . .	3.1	6	10	48	8	1	12	12	27	124
April . . .	5.3	9	3	17	10	4	32	23	22	120
May . . .	6.8	13	3	15	11	22	27	32	1	124
June . . .	8.9	5	4	7	11	21	56	16	—	120
July . . .	8.0	4	7	11	17	23	49	12	1	124
August . . .	8.6	3	6	7	19	27	42	20	—	124
September . .	8.4	5	7	12	13	17	48	18	—	120
October . . .	7.5	11	4	23	7	7	60	12	—	124
November . .	5.2	8	7	43	17	6	171	49	59	360
December . .	4.8	10	8	27	20	7	145	106	49	372
1896										
January . . .	6.3	9	7	26	4	7	236	62	21	372
February . .	5.9	15	7	33	11	8	119	61	6	260
March . . .	8.4	4	5	15	4	9	51	36	—	124
April . . .	6.6	12	4	20	7	8	32	29	8	124
May . . .	7.7	7	4	14	16	13	45	23	2	124
June . . .	7.7	17	6	5	19	6	48	17	2	124
July . . .	8.5	5	3	6	8	10	61	18	5	116
August . . .	8.6	7	9	8	13	23	50	14	—	124
September . .	8.8	8	17	6	4	30	38	17	—	124

Snow fell in every month, rain in June, July, August, and September, but only occasionally. Fog occurred in the warmer months, mist was very common. There was an appreciable amount of cumulus. Meteorologists have yet to explain the presence of that cloud in an atmosphere below the freezing-point of water, and even below zero.

REMARKS, ETC.

SEPTEMBER, 1894

1st. In latitude $79^{\circ} 9' N.$, longitude $45^{\circ} 10' E.$, the sea exceedingly smooth and oily.

8 P.M. Quantities of young ice formed on the water during the night.

3d. 2 A.M. Sighted Cape Neale, stood to N.E. to clear ice.

4.30. Stopped by ice barrier about forty miles to southward of Cape Grant.

10. Ice fast and unbroken right up to the land.

8 P.M. Frequently running into bights, and steering various courses out of them.

4th. 8 A.M. Through loose ice.

3.30 P.M. Water more clear.

MDN. Proceeding N.E. through channel of open water.

5th. 4.30 A.M. Stopped by fast ice. Bell Island bearing about N.E., distant 30 miles.

8. Rammed bay ice, and proceeded through it for four hours.

4 P.M. At sunset a brilliant shaft of light was thrown to about 5° altitude, perpendicularly above sun.

MDN. Ice parting; proceeded to N.E. through very tough young ice, two to three inches in thickness.

6th. 5 A.M. Anchored to floe; thick fog.

8 P.M. Ice cracking.

MDN. Floe drifting into ship; shifted position.

7th. 4 A.M. Ramming ice; broke through; anchored to floe.

8.45. Forced ship through ice, and proceeded.

NOON. Bell Island bore N. 35° W. $1\frac{1}{4}$ mile. Sounded in 30 fms.; fine sand. Proceeded up Miers Channel.

5.30 P.M. Sounded 57 fms., mud, Windward Island bearing S. 30° E., $\frac{1}{4}$ mile.

8th. 4 A.M. Proceeded across Miers Channel to N.W. point of Northbrook Island.

NOON. No bottom at 100 fms. Proceeded down channel.

5.30 P.M. Off Cape Flora. Wind blowing from gullies in fierce gusts.

A THOUSAND DAYS IN THE ARCTIC

- 9th. 5 A.M. Fast to floe three miles W. of Cape Barents.
 NOON. Driven off Cape Barents, and made fast to floe about two cables distant from precipitous cliffs 150 feet high. Second engineer thought the ship scraped rock. Sounded all round: 16 to 7 fms., sea-shells, black gravel (basaltic) and rocks.
- 10th. 3 A.M. Off Cape Flora, fast to floe.
 10. Sounded off land floe, south point of Cape Flora, obtaining 16 to 5 fms. Made fast to floe and a small berg in 5 fms. at most suitable place for landing gear, distant 1.1 cable from shore. Here the *Windward* wintered, "Elmwood," our hut, being 400 yards distant.
- 12th. 10 P.M. Bay ice forming rapidly.
- 19th. MDN. Furious gusts of wind every now and again.
- 20th. 2 A.M. Ship broke away from moorings. Got up steam, and by full speed managed to make her fast by 4 A.M., when gale decreased in force.
- 22d. 2 to 6 P.M. Wind all round compass; very strong gusts from hills at times.
- 25th. NOON. Very fine snow falling thickly, like fluffy down, crystal shaped.
- 26th. 10 to NOON. Fog-bow. Then very fine snow only visible in sun-beams.
- 29th. Lanes of water opened in floe to southward and westward in morning, closing towards evening.
 4 P.M. Snow crystals shaped with various patterns between points
- 30th. 2 A.M. Frost-rime, three to four inches in thickness, formed on spar and rigging.

OCTOBER, 1894

- 4th. 10 A.M. Ice blown away to southward from 300 yards south of ship. Snow driving thickly throughout.
- 5th. 4 P.M. At sunset a long, dusky red column of light was thrown above sun and in contact with it to altitude 15° ; another similar appearing 20° to southward of sun parallel to former one. A mile and a half from ship towards Miers.
- 18th. 2 P.M. Channel (northwesterly), found there was no wind whatever
 10 A.M. to 6 P.M. A dozen cir-c. clouds, solid appearance, like thick drifts of snow, with very rounded backs, dark colored and tinged with red and pink, were visible in N.W. and W. portion of sky with no apparent motion, altitude 40° . Meanwhile very long regular lines of cir-s. were stretched to and over one another for 15° above sun.
- 23d. 6 A.M. Frost smoke rising in great quantities from open water about half a mile from ship to S.W. Bay ice forming rapidly.
- 28th. Wind steadier than usual throughout the day. Occasional fierce gusts throughout, force 10 to 11.

APPENDIX

29th. 10 A.M. to 2 P.M. Wind varying every few minutes between N.W. and S.E.

MDN. Ice cracking loudly near shore.

30th. 6 P.M. Ice-pressure taking place under influence of southerly wind.

31st. MDN. Yesterday left seal-hook stuck in ice, with line attached to it, and made fast to harpoon, which was driven into a dead walrus afloat on open pool. This morning went for it; found that everything had been overriden and driven under by ice-pressure.

NOVEMBER, 1894

3d. Open water 300 yards from ship, extending to Mabel Island and up Miers Channel.

12th. 4 P.M. When out on floe 300 yards from ship found it quite calm, but strong gusts blowing round stranded bergs every few minutes.

17th. Members of land party removed to the hut ashore.

20th. 10 A.M. Mist similar to Scotch mist.

21st. Snow driving fiercely during gale formed drifts 2 to 7 feet in height.

24th. 2 P.M. Warm balmy wind.

8.10. Sharp shower of rain three minutes' duration.

8.20. Fine snow commenced falling.

27th. 4 P.M. Dark, well-defined water-sky over horizon from E. through S. to W.

28th. NOON. Red glow on horizon to southward.

DECEMBER, 1894

6th. Snow driving thickly throughout.

7th. 6 P.M. Clouds passing quickly from N.W.; calm below.

8. Large semi-circular halo over moon, radius 14° .

9th. MDN. Halo round moon, diameter 28° .

10th. 6 P.M. Clouds moving from W. to E., medium rate, wind E.N.E. 4.

8. Clouds moving from W.S.W. to E.N.E. slowly, calm.

10. Clouds moving from N.W. to S.E. medium rate, wind E. 3.

12th. 4 P.M. Halo round moon, diameter 28° .

19th. Loud rustling and whistling sound of ice in motion could be heard to-day during the calm.

22d. Snow crystals shaped similarly to those of September 29th.

28th. MDN. Ice cracking loudly on floe under influence of tide and pressure.

JANUARY, 1895

6th. Large snow-drifts formed on S.W. side of house nearly to top.

8th. NOON. Orange-colored glow over southern horizon.

9th. 8 P.M. Large halo round moon, diameter 44° .

14th. 2 A.M. High snow-drifts about house, especially to S.W. of it.

24th. 4 P.M. Ice making loud roaring noise.

A THOUSAND DAYS IN THE ARCTIC

- 27th. 2 P.M. Frost smoke rising thickly at the bases of Bell and Mabel Islands.
- 29th. MDN. Air full of particles like fine powdery falling snow. Stars shining brilliantly at same time all over the heavens.
- 31st. 2 P.M. Moon and Jupiter visible only; light too strong for other celestial bodies to be seen with naked eye.
- 8.30. Sky quickly became overcast. Just previously all celestial bodies brilliantly visible.
10. Could see islands to westward distinctly outlined on horizon. Stratus clouds hanging thickly just over them.

FEBRUARY, 1895

- 2d. 2 A.M. Saw long stretch of open water to-day extending from opposite the centre of Mabel Island, round by Cape Flora, and away E. about two miles from the shore.
- 6th. 6 P.M. Double halo round moon.
- 8th. 8 P.M. Thick frost smoke by Bell and Mabel Islands.
10. Cirrus moving from N. to S. with great rapidity, wind N.W. 5.
- 11th. NOON. Frost smoke rising thickly at S.W. and N.W.
- 15th. 10 P.M. About a mile out on floe to southward found large wide expanse of water where ice had opened out under influence of tide and current.
- 17th. 8 P.M. When walking out on floe found that late gale had brought down great quantity of ice and pressed it up against our floes in huge hummocks.
- 18th. Ice appeared quite changed to-day, when off our land floe. Saw it at work thus: Walking outside a huge mass of heaped-up ice which had been crushed up on the fast ice, could hear groans and creakings from it every now and again. Climbed over inside of it and saw a crack in the floe (which appeared to be 18 feet in thickness), and it gradually widened out, the whole enormous mass of hummocks being moved off by the tide. Watched it open out about 10 feet.
- 19th. Could see frost smoke rising a long way to southward and westward during A.M., and to S.E. and E. during P.M.
- 21st. 6 A.M. Frost smoke rising thickly to S.E., S., and S.W.
- 27th. 4 P.M. Frost smoke rising thickly to S.S.W. and W.

MARCH, 1895

- 1st. 4 P.M. Snow driving in fine icy spiculæ.
- 3d. 6. No water to be seen.
10. Double halo round moon. Inner halo yellow, with border of brown-yellow. Outer halo dark green, with border of red-brown. Inner diameter $1^{\circ} 36'$, outer $2^{\circ} 36'$.

APPENDIX

- 5th. 4. Frost smoke rising at southward.
- 6th. NOON. Parhelion, radius $22^{\circ} 0' 25''$; corrected altitude of sun's lower limb, $4^{\circ} 22' 30''$.
- 8 P.M. Cirrus travelling rapidly across the heavens from eastward, calm below.
10. Paraselena, radius $22^{\circ} 31' 45''$.
- 7th. NOON. Parhelion and paraselena, as yesterday.
- 8th. Ascended to summit of Cape Flora. Ice to southward and westward very much broken up, there being numerous lanes of water.
- 9th. 8 A.M. Parhelion visible on sun rising, soon disappeared.
- 17th. 8 A.M. Parhelion.
- 19th. 8. Parhelion; air full of small icy particles.
- 21st. Snow driving thickly, could see it blown furiously in whirls at twenty to one hundred yards distant over narrow space of ground, and blowing strongly down Miers Channel continuously.
- 23d. NOON. Long lines of cirro-stratus, arched from E. to W. points of horizon, all over heavens, having common N. foci in those points. Thickness of ice on this year's floe, 4 ft. 8 in.
- 24th. 4 P.M. A long straight line of thin mist half-way up Bell and Mabel islands, looking like cirro-stratus.
- 25th. NOON. Blowing in gusts, forces 1 to 8. When out on floe, in direction of Miers Channel, wind appeared to be blowing strongly from N.E.; at house N. force 1.
- 26th. Could hear wind blowing furiously from N.W. during night.
- 27th. 8 A.M. Aneroid falling .05 during gusts and rising again as they died away; mercurial barometer affected to smaller extent.
- 28th. 4 P.M. Saw what appeared to be open water about 11 miles to southward.

APRIL, 1895

- 1st. 4 P.M. Snow driving hard, formed high, thick drifts about hut.
- 2d. Snow driving hard throughout, cannot say positively whether or no snow was falling.
- 3d. Snow driving thickly throughout.
- 6 P.M. Ice broke up to alongside the ship; intact inshore.
8. Ice drifted away to S.W.
- 4th. 8 A.M. Frost smoke rising thickly from open water.
- NOON. Bay ice forming quickly outside ship.
- 6th. 8 A.M. Clouds moving rapidly from S.W., calm below. Very thin powdery snow falling, hardly perceptible.
- 6th. 4 P.M. Open pool and lanes of water a quarter mile from land.
- 7th. NOON. Frost smoke rising thickly.
- 8th. NOON. Parhelion. Frost smoke.
- 9th. 6 P.M. Parhelion.
8. Long, wavy, arched cirrus clouds running over one another.

A THOUSAND DAYS IN THE ARCTIC

- 10th. NOON. Pools of water all round, 300 yards from shore, with frost smoke rising from them.
12th. Parhelion all day, very faintly defined.
13th. 8 A.M. Parhelion. Air full of small icy particles.
NOON. Frost smoke rising very thickly.
18th. 8 P.M. Small, glistening particles falling.
20th. 10 P.M. Semi-parhelion over Mabel Island.
21st. 10.30 P.M. Semi-parhelion over Mabel Island.
25th. NOON. Bay ice from a mile from coast to horizon ; some lanes of water in it.
8 P.M. Clouds passing over from W. to E., wind N. to W. 3.
26th. NOON. High cirrus passing from N.W. to S.E. all day ; wind N.N.W. 4.
27th. 8 A.M. Cirro-stratus passing quickly over zenith from S. to N. ; wind E. 1.
MDN. Calm ; cirrus passing from W. to E. over zenith.

MAY, 1895

- 2d. 4 P.M. Cirro-stratus passing rapidly from N.W. to S.E. ; wind N.W.
Small pools of water at S.W. distant 3 miles.
3d. NOON. Open water 2 miles out. Narrow lanes 4 miles long.
7 P.M. Much water for about ten miles from E. to W.
4th. 8 A.M. Sheet of open water 10 miles long.
5th. 8 A.M. Open water from Cape Grant to 4 miles south of Cape Gertrude on southern horizon.
8.30. Parhelion.
6th. 8 A.M. Ice visible beyond open water at S., extending for about two miles to horizon.
7th. 8 A.M. Water extending to horizon for about a mile from beach.
8th. 8 A.M. Water at S. and W. as far as visible.
8 P.M. Ice visible on horizon except at W.
10. Bay ice formed on open water.
9th. NOON. Very little water visible, thin bay ice having nearly entirely covered it.
12th. NOON. Narrow lanes of water.
13th. 8 A.M. Large expanse of water at S.
14th. 8 A.M. Large expanse of water at S.E. and W. nearly to horizon.
15th. Open water as yesterday.
16th. 10 A.M. Water southward and westward as far as can be seen, commencing about three-quarter mile beyond ship.
8 P.M. Ice making great noise, coming in from S.E.
18th. 8 A.M. Scarcely any ice visible southward and westward.
4 P.M. Large pieces of ice peeling off from floe.
19th. 8 A.M. Large expanse of water to southward and westward.

APPENDIX

- 22d. NOON. Quantity of water to southward and westward about twelve miles distant.
- 23d. NOON. Open water as far as can be seen from 150 of elevation to southward and westward.
- 4 P.M. Large pieces of ice peeling off land floe.
- 24th. 4 A.M. Cirrus moving from S.E. to N.W.; wind N.N.W. 5.
8 P.M. Cirrus moving from W. and S.E., taking circular motion as cloud meets cloud.
- 25th. NOON. Except land floe, no ice visible from 570 feet elevation to S.E., S.W. and W.
- 30th. A.M. A quantity of young and brush ice up against floe and to southward.

JUNE, 1895

- 1st. 8 P.M. A quantity of young ice cleared away to westward.
- 2d. 8 A.M. Ice brought in again by southerly wind.
- 3d. 6.30 A.M. A heavy shower of rain.
- 7th. NOON. Very fine snow falling.
- 13th. NOON. Ice blown out by northerly wind.
- 14th. NOON. Large expanse of open water.
- 15th. 4 P.M. Ice peeling off land floe.
- 22d. 8 P.M. Some ice driven off floe at eastward and westward.
- 26th. 8 A.M. Ice peeling off land floe.
- 29th. NOON. Ice gradually peeling off land floe.

JULY, 1895

- 1st. 8 P.M. Southerly swell.
- 2d. 8 P.M. Ice broken up to outside of ship by swell.
- 3d. 3 A.M. Ship departed. Clear open water to horizon.
- 7th. 8 P.M. Long arched lines of cirro-stratus under sun.
- 10th. 5 P.M. Thick mist spread over from S.W.; could very plainly see specks of mist falling; continuous fog-bow.
- 10 P.M. Parhelion.
- 15th. 4 P.M. Short showers of snow at frequent intervals.
- 16th. 4 A.M. Sharp showers of mingled snow and hail; 15 minutes.
- 23d. NOON. Ice visible at E.
8 P.M. Ice moving from E. towards S.
- 26th. NOON. Ice visible at S.
4 P.M. Heavy swell from S.W.
- 27th. 8 A.M. Large quantities of loose ice at E., S. and S.W.
- 30th. 8 A.M. Drift ice in all directions.
- 31st. NOON. Heavy swell.

AUGUST, 1895

- 1st. NOON. Heavy southerly swell.
- 3d. 8 P.M. Drift ice from eastward.

A THOUSAND DAYS IN THE ARCTIC

- 7th. 8 A.M. Drift ice at west.
13th. NOON. Large quantity of ice coming in from eastward.
14th. 8 A.M. Large quantities of ice visible to southward and westward;
clearer near Cape Flora.
15th. 8 A.M. Quantities of drift ice about, but clearing away.
16th. NOON. Drift ice all round the cape.
17th. NOON. Ice as far as can be seen from an elevation of 500 feet.
19th. 8 A.M. Ice clearing away from land slightly.
4 P.M. Sea almost clear of ice to westward.
8. Clouds moving rapidly from S.W.; wind N.N.W. 2.
24th. NOON. Wind flying round compass in gusts, force 5 to 6.
30th. NOON. Ice blown from shore about three miles by wind.

SEPTEMBER, 1895

- 3d. 4 P.M. Occasional falls of snow.
9th. 8 A.M. Quantities of loose ice covering the water.
14th. NOON. Bag ice forming.
15th. 4 P.M. Ice closely packed inshore.
16th. 4 P.M. Ice driven out $1\frac{1}{2}$ miles.
21st. 8 A.M. Ice out about six miles.

OCTOBER, 1895

- 2d. 4.45 P.M. A red shaft of light upward from sun, extending to altitude 15° .
5th. 4 P.M. Long arched lines of cirro-stratus over sun.
7th. 8 A.M. Bay-ice broken up by winds.
15th. 11.20 A.M. $\odot 1^{\circ} 43'$ h. e. 50 feet. Brilliant shaft of light thrown up by sun to altitude $21^{\circ} 58' 10''$ from sun; prismatic coloring.
22d. 4 P.M. Apparently open water on horizon between E.S.E. and W.S.W. about fifteen miles distant; heavy water-sky.
24th. 8 P.M. Heavy water-sky at S.
26th. 8 A.M. Heavy water-sky over horizon from S.E. to W.S.W.
8 P.M. Very fine snow falling.

NOVEMBER, 1895

- 2d. 10 P.M. Large paraselena; snow driving.
6th. Snow driving very hard and thickly throughout.
9th. 4 A.M. Paraselena.
NOON. Clouds moving rapidly from westward; calm below.
12th. NOON. Sun-glow at S. and S.E.
13th. 10 A.M. Cirro-stratus arched over horizon at S.
2 P.M. Arch of cirro-stratus across whole heavens from W.N.W. to E.S.E., meeting in common force.
15th. 4 A.M. Lane of water about a mile out on floe, from S.E. to W.S.W.

APPENDIX

- 16th. 6 A.M. Lanes of water one-half to three-fourths of a mile out on floe and a little way up entrance to Miers Channel.
 NOON. Terra-cotta-red glow at S.; sapphire-blue sky.
- 26th. 4 A.M. Large expanse of open water at S.S.W., extending to W.S.W.
 4 P.M. Gusts from between W.N.W. and N.N.W., force 6 to 10, every two or three minutes; calm in intervals. These gusts blow sometimes over the house while it is calm in other places, and *vice versa*.
- 28th. 8 P.M. Halo round moon.

DECEMBER, 1895

- 1st. MDN. Cirrus moving rapidly from S.; wind E. 1.
- 12th. NOON. Red glow on southern horizon.
- 13th. 4 A.M. Air filled with small falling particles of mist.
 4 P.M. Air filled with small falling icy spicules.
- 14th. 8. Very black water-sky from S.E. to W.S.W.
- 15th. 2 A.M. Large expanse of water to southward since heavy gale on 9th.
 2 P.M. Very fine snow or thick particles of mist falling.
- 18th. 8 A.M. Light of dawn at S.E.
 NOON. Rose-colored light at S.
- 19th. NOON. Glow of dawn on southern horizon.
- 28th. 4 P.M. Small chrome-colored halo round moon.
- 29th. 4. Very large halo round moon.
- 30th. 4 A.M. Frost smoke rising from open water.
- 31st. 4 P.M. Large halo round moon.
 8 P.M. Thick frost smoke rising from water at S.E. through S. to W.

JANUARY, 1896

- 1st. 6 P.M. Large halo round moon.
- 17th. 10 A.M. Stratus over southern horizon believed to be due to large quantities of frost smoke rising from considerable area of open water.
- 18th, 19th, 20th. Very fine snow.
- 20th. 6 P.M. Air full of small falling powdery particles.
- 21st. 6 A.M. Air full of small particles.
 8. Wide expanse of water to southward.
 4 P.M. Large faint halo round moon.
- 25th. 2. Frost smoke rising thickly from large expanse of water, visible to southward, eastward, and westward.
- 28th. 10 A.M. A large expanse of open water extending to horizon at S., and E. and W. of it, half to three-quarters of a mile from shore.
 Bay ice forming rapidly.
 NOON. Bright orange glow at S.

A THOUSAND DAYS IN THE ARCTIC

- 29th. NOON. Bright orange glow. Light eclipsing stars under third magnitude.
4 P.M. Loud noise of ice-pressure.
MDN. Everything covered with frost rime.
- 31st. 4 A.M. Frost rime on everything.
8. Brilliant dawn at S.E.

FEBRUARY, 1896

- 1st. 10 A.M. Ice-blink at S.E. and S.; heavy water-sky as S.W. and W.
- 3d. 6. Could hear wind blowing through gullies at top of Cape Flora rocks; calm below.
NOON. Ice as far as can be seen; a crack open three-quarters of a mile distant.
2 P.M. Very clear on southern horizon for 2° above it between S.E. and S.W.
MDN. A long lane of water opened E. and W. at the edge of the land floe.
- 4th. 10 A.M. Long, open, wide space of water at S.W.
- 6th. 6 A.M. Frost smoke from large lane of open water at S.W. and W.
- 7th. NOON. Large expanse of water at S. extending E. and W.; frost smoke rising thickly.
- 8th. NOON. Frost smoke rising thickly at W.N.W. obscuring Bell Island. Big ice on horizon. Bay ice and open lanes between it and land floe.
- 11th. 10 A.M. Semi-arch of light at S.E. blue sky; clouds moving rapidly from S., wind E. by S. 3.
NOON. Fan-shaped, rose-tinted shaft of light thrown to 20° above horizon at S.
- 13th. 8 P.M. Long lane of water S., extending E. and W., formed by ice opening out from land floe, caused by wind and tide.
- 14th. 2 P.M. Cirro-stratus arched in long lines over the sun.
10 A.M. Air full of icy particles.
- 17th. 2 P.M. Stratus all round horizon like fog-bank.
- 19th. 6 A.M. Open water visible on S.W. horizon; frost smoke rising thickly from it.
- 20th. NOON. Open water at S. and W., frost smoke rising from it.
- 21st. 4 A.M. Loud rushing sound of wind blowing among cliffs on top of Cape Flora.
- 22d. 4 P.M. Ice-blink round horizon.
- 23d. NOON. Mist on horizon, caused by frost smoke from open water, ice being carried out. Very high upper clouds.
- 24th. 8 A.M. Large expanse of open water at S., extending E. and W.
8 P.M. Clouds driving across moon from W.S.W. to E.N.E.; S.W. 5
- 25th. 8 A.M. Very thick mist 400 feet up talus, slight mist lower down.

APPENDIX

- 16th. 8 P.M. Rushing sound among rocks at top of Cape Flora, apparently strong wind blowing there.
17th. 8 A.M. Large open lane of water at S. and to E. and W. of it; frost smoke rising from it.
18th. 8 P.M. Large expanse of open water at S. and E. and W. from it.
19th. 8 A.M. Open water being covered with bay ice.

MARCH, 1896

- 1st. NOON. Frost smoke rising from open water one mile distant.
4th. 4 P.M. Cirrus moving from S.W.; wind W.N.W. 1.
6th. Snow-flakes shaped (size ●).
18th. 8 A.M. Air full of icy particles.
19th. 4 P.M. Open water at S. and S.E. three miles distant.
20th. Snow driving throughout.
21st. NOON. Parhelion.
4 P.M. Some lanes of open water at S.W. distant one mile.
22d. 8 A.M. Parhelion.
23d. NOON. Parhelion.
8 P.M. Halo round moon.
26th. 8 P.M. Brilliant orange-colored sunset.
27th. 8 P.M. Cirro-stratus moving from S.W., calm below.
30th. 8 P.M. Rushing noise among rocks at summit of Cape Flora.

APRIL, 1896

- 8th. NOON. Snow driving hard throughout.
11th. 8 P.M. Frost rime forming thickly.
14th. 8 A.M. Ice driven out by wind.
8 P.M. Clouds passing over from S.W.; wind E.
16th. 4 P.M. Long wavy interlaced lines of cirrus.
19th. NOON. Very numerous cirrus clouds moving rapidly from E.S.E.; wind E. 3.
24th. Parhelion all day.
29th. 1.30 A.M. Clouding over from southwestward; wind N.W. 1.

MAY, 1896

- 8th. 4 P.M. Parhelion.
9th. NOON. Heavy water-sky at S.E., S., and S.W.
4 P.M. Open water to southward.
11th. 8 A.M. Parhelion.
16th. 8 A.M. Very black water-sky at S.E., S., and S.W.
19th. 8 A.M. Large expanse of open water at S.
22d. 4 P.M. Very fine falling snow shaped †; some hard, round (size ●) like hail.

A THOUSAND DAYS IN THE ARCTIC

- 25th. 12.30 A.M. Commenced raining.
30th. NOON. Ice being blown off by wind, open water, and very heavy water at southward.
31st. 8 A.M. Large expanse of water at S.E., S., and S.W.
NOON. Much refraction.

JUNE, 1896

- 1st. 4 P.M. Very heavy water-sky to southward.
5th. 8 A.M. Large expanse of water at S.S.W. and W. Clouds passing rapidly from N.; wind S.E. 6.
7th. NOON. Large extent of water at S.
4 P.M. Ice peeling off land floe.
8th. Very wet falling snow throughout.
13th. 8 P.M. Cirro-stratus arched under sun, over horizon.
20th. 4 P.M. Thick mist hanging over top of land.
8. Hard, unevenly shaped icy flakes.
10. Raining heavily, and during greater part of night.
21st. 4 P.M. Mist hanging over tops of islands.
8 P.M. Clear below 300 feet, mist above.
22d. 8 P.M. Mist commenced at 100 feet elevation.
23d. NOON. Very fine rain, like Scotch mist, till 8 P.M.

JULY, 1896

- 14th. 8 A.M. Mist hanging very thickly over top of land.
21st. NOON. Clouds driving from northward; wind variable from eastward.
25th. 4 P.M. Mist hanging thickly over top of land.

AUGUST, 1896

- 7th. 4 P.M. Very fine snow.
26th. NOON. Mirage of ice at S.
8 P.M. Cirro-cumulus moving rapidly from S.W.; wind E.S.E. 1.
30th. NOON. Snow like half-formed hail.
31st. 8 P.M. Cirro-cumulus moving slowly from N.E.; wind N.N.W. 5.

SEPTEMBER, 1896

- 16th. 4 P.M. Summit of Cape Flora just capped with cloud.
18th. 8 A.M. Thick, low fog; fine and clear overhead; fog-bow.
19th. 8 P.M. Low, thick fog-bank coming down Miers Channel at W., and by Cape Gertrude at E.; islands just visible above it.
20th. NOON. Very wet mist.
23d. NOON. Clouds in layers along the land.
25th. 8 P.M. Very fine rain. At 9.30 snow falling thickly.

APPENDIX

26th. NOON. Drizzling since last observation. Glazed frost.
8 P.M. Clouds nearly to sea-level.

27th. 8 A.M. Thick bank of fog at E. across lower part of land; same at
W., rising to 600 feet.

OCTOBER, 1896

4th. NOON. Mist hanging thickly over top of land.

5th. 8 A.M. Clouds moving rapidly from N.E.; wind N.W. 1.

JOURNAL OF AURORA

THE situation of the observatory was not altogether favorable for observing aurora. High ground hid the horizon from N.E. to N.W. to an altitude of 1300 feet. The highest point is 1400 feet, and its horizontal distance from the observatory was about 1200 feet. The bearings given are true, not magnetic.

SEPTEMBER, 1894

- 23d. MDN. Faint aurora; long streamers across zenith.
- 24th. MDN. Aurora for 15 minutes, pale green, W.S.W. to S.S.E., and in zenith; disappeared to eastward.
- 25th. 11.40 A.M. to 5 P.M. Clear overhead. Observed aurora; altitude 60° ; long, narrow bands S.S.E., moving S. to N. and disappearing.
- 30th. MDN. Aurora, pale green, S.W. to E.; altitude of arch, 70° ; streamers radiating from it.

OCTOBER, 1894

- 8th. MDN. Aurora, pale green, S.E. to N.W., across zenith; altitude 30° at extremes; broad band.
- 10th. MDN. Arched aurora N.W. and W.; long streamers to N.E.; pale yellow-green tint, like rays thrown from under cloud by sun.
- 11th. MDN. Aurora E.N.E. to W.S.W.; large arch 10° altitude in E.N.E. 50° in centre, 20° in W.S.W. extreme.
- 14th. 8 P.M. Aurora, pale green, W. to E., 10° above west horizon across zenith, 50° above east horizon in arch; several streamers from it; another small arch at W. extreme of larger one.
- 15th. 8 P.M. Aurora, pale green, narrow band across zenith E. to W., 70° altitude at each extreme; three streamers in N.W. just over horizon to 15° .
- 18th. MDN. Aurora chiefly N.W. to E., pale green, moving towards S.E.; arches and streamers appearing and disappearing like rolling of scroll.
- 19th. MDN. Slight aurora, pale green, S.W., altitude 30° ; streamer to S.S.E. altitude 60° .
- 21st. 5.30 P.M. Two long streamers (or bands) close together and parallel. E. to W. across zenith; west extreme 40° altitude, east 10° , pale green.

APPENDIX

- 22d. 5.30 P.M. Three large streamers (or bands) E. to W. across zenith ;
15° altitude at east, 30° at west.
- 24th. MDN. Aurora E. to W. across zenith ; altitude at extremes 15° from
horizon ; streamers from N. and N.W., main band or streamer
moving to N.W., pale green.
- 25th. MDN. Slight aurora, four short streamers 15° apart round Ursa Major
and Minor.
- 27th. MDN. Aurora, pale green, streamers on western horizon, extending
to altitude 70°.
- 29th. 6 P.M. Brilliant aurora, pale but vivid green, large band E. to W.
6.45. Thick, cloud-like form of aurora, covering and concealing Ursa
Major, sent out long streamers to N. and N.W., moved rapidly W.
8. Aurora moving rapidly from E. to W. and N. to S.; many arches
and streamers entirely covering the sky.

NOVEMBER, 1894

- 2d. 7.30 P.M. Pale green aurora, band extending from E.N.E., altitude 10°
to 30°, another band commencing at nearly the end of above and
underneath it extending to W. altitude 20°. First band had numer-
ous streamers from it.
- 3d. 12.20 A.M. A long band of aurora, altitude 10°, S.S.E. to S.W. Two
streamers appearing like shafts of light from cloud in N.W., mov-
ing W.
5 P.M. Auroral bands pale green, E.N.E. to W.S.W.; streamers in N.W.
MDN. Aurora N. to W.
- 4th. MDN. Several small auroral streamers, pale green, E.S.E. to W.S.W.,
altitude 10° in E.S.E., 70° in S., 2° in W.S.W.
- 8th. 5.30 P.M. Aurora four, bands E. to W. and N.W.; thick cream-like
color ; outer bands 30° to 70° altitude, E. extreme 10°, W. extreme
20°.
- 8.30 P.M. Aurora N. and N.W.; arch and streamers pale green.
MDN. Aurora E. through S. to W.S.W., pale green.
- 9th. 9 P.M. Aurora, bands of pale green over nearly the whole heavens,
especially in N.W. Many streamers. One part of aurora in N.W.
expanding and contracting and shooting about like flames darting
upward, finally disappearing rapidly to southward.
- 10th. MDN. Few small pale green streamers of aurora in N.W., varying
from 10° to 60° altitude.
- 11th. 7 A.M. Aurora commenced in streamers at E. horizon, rapidly spread
across zenith towards W., scintillating and shooting like flame
till it reached W. horizon ; then formed into long thick bands, pale
green ; again separating into three bands which sent out numerous
streamers and moved rapidly as before ; finally breaking-up and
moving to northward.

A THOUSAND DAYS IN THE ARCTIC

- 13th. 1 P.M. Faint aurora, pale green, broad band E. to W.
4 P.M. Similar aurora at N.W. quickly disappeared.
- 14th. 6 to 7 P.M. Similar aurora to that of 11th; and from 9.20 to 9.40.
- 18th. 6 P.M. Brilliant aurora, similar in most respects to those of 11th and 14th; not quite so much color, but larger N.E. to S.W.; moved in circle round heavens against watch at altitude 70° ; quite disappeared twice and reappeared in same place and shape. This aurora differed from those of 11th and 14th in having a double corona, one shooting out towards N.W., the other to S.E., with streamers at right-angles.
- 19th. NOON. Aurora: streamers rising at E. gradually forming into long band E. to W. at altitude 70° , dividing into four bands and into numerous and varied spiral shapes, chiefly in S.E., until P.M., when it became overcast.
- 30th. 4 P.M. Two auroral streamers at N.W.
7.15. Auroral band from E. over zenith to W.
8.3. Similar aurora, like the former moving rapidly to E.

DECEMBER, 1894

- 1st. 10 A.M. A few auroral streamers N.E. to W.
- 2d. NOON. Three auroral streamers, extending to altitude 30° in N.W.: red glow to southward.
- 5th. 10.5 P.M. Brilliant aurora commenced in long streamers from E. through S. to W., coming to apex 10° below Polaris at 10.15. Long ridge of thicker light 5° above horizon, the whole spread out like a fan: some parts of base thicker than others and separated in circles.
- 10.25. Fringe of streamers changed from pale green to rose, brick-red and bright green, and commenced moving rapidly and laterally to eastward with shimmering appearance. As one layer disappeared another opened out in numerous streamers, like a fan and moving as previous ones.
- 7th. 10.15 P.M. Pale green band of auroral light shot rapidly across heavens from E. over zenith to W.
- 9th. 8 P.M. Four auroral streamers at E.
- 19th. Aurora all day in bands and streamers, chiefly E. to W.; culminating at 8 P.M. in brilliant display E. to W., being of spiral, fanlike and circular shapes. Thick circular masses in W. extreme, sending out streamers with rapid lateral motion to N. (having fringe of prismatic colors), which again closed up into bands and moved laterally and rapidly to the southward and disappeared, appearing to rise as it did so.
- 28th. 2 P.M. Auroral streamers in N. and N.W., with fringe of varied colors, altitude 30° . Bands across heavens from E. to W., moving laterally from N. to S. at frequent intervals during afternoon.

APPENDIX

- 29th. Aurora throughout most part of the day. Bands E. through S. to W., chiefly 10° to 50° altitude.
- 30th. 8 A.M. A few streamers extending to 20° altitude at N.W.
- 31st. 2 A.M. Auroral band across zenith E.S.E. to W.S.W.
4. Similar aurora.
- 4 P.M. Auroral band across zenith E. to N.W., with streamers at N.W. and W.
6. Three auroral bands across heavens E. to W.; large cloudlike patch in zenith.
8. Three auroral bands across heavens E. to W., altitude 20° to 50° .
10. One auroral band across heavens E. to W., altitude 10° . streamers at intervals shooting up perpendicularly.
- MDN. Two auroral bands from E.N.E., altitude 30° to W., meeting horizon.

JANUARY, 1895

- 1st. 2 A.M. Streamers extending all over heavens.
- 6 P.M. One small streamer at N.W.
10. Streamers E. to S.W., altitude 10° to 70° .
- MDN. Corona in zenith, with streamers shooting out all round heavens, having rapid circular and lateral motion.
- 5th. 5.30 P.M. While making observations for inclination with dip-circle, the needle was much disturbed for five minutes.
- 6th. 8 P.M. Large auroral corona in zenith, with numerous streamers from it all round heavens. At 8.10 streamers closed with lateral movement to eastward, and collected in single broad thick band of sinuous shape E. to W.
- 7th. 2 A.M. Auroral band across zenith E. to W.
8. A few isolated streamers at N. and N.W.
- 9th. 6 P.M. Aurora at N.W., circular shape, with streamers.
- 15th. 10. Aurora gathered in bands and circular pale green masses between E. and S.W., at altitude 20° ; sent streamers up rapidly to zenith, which formed at 10.10 brilliant corona, which together with streamers circled round heavens, gradually (apparently) disappearing in space, leaving a faint white light of their shape, which was visible for half an hour. One circular mass moved round heavens to W. and N. and sent out streamers with lateral movement which darted about in all directions, and finally disappeared as the others had done. The coloring of this display was brilliant rose and green.
- 16th. 6 P.M. Aurora in detached, cloudlike masses, altitude 5° to 30° , with a few very short streamers rising upward from them. At 8^o similar.
- MDN. Brilliant corona in zenith, with streamers radiating from it all round heavens to horizon, rose and green coloring.

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- 17th. 4 A.M. Four bands of auroral light across heavens from N.N.E. to S.S.W.
 8. A few streamers at N. and N.W.
 2 P.M. Serpentine auroral band from E. through zenith to W.
 4. Band from E. to S.W., altitude 10° .
 8. Similar band. Almost constantly throughout the day there have been bands and streamers from E. through S.S.W. and N.
 MDN. Fine auroral display. Corona in zenith, streamers shooting out in all directions and moving rapidly with circular and lateral motion.
- 18th. 8 A.M. Streamers at E. and S.W., altitude 50° to 70° .
 NOON. Indistinct corona in zenith, with streamers radiating from it all round heavens, apparently very distant, could only see part of it.
 4 P.M. Auroral band from E. through zenith to W., with a number of brilliant fan-shaped streamers having fringes colored rose and green.
 6. Streamer at N.W. and W.; band from E. through S. to W.
 8. Bands from E. through S. to W., altitude 5° to 20° .
 MDN. Streamers at E., E.N.E., and W.S.W.
- 19th. 2 A.M. A few streamers on western horizon.
 4. Two small streamers at zenith.
 6. Irregular band or arch across zenith N.E. to S.W.
 8. Corona with streamers radiating from it all round heavens.
 NOON. Two small streamers in N.W.
 2 P.M. Sinuous band E. to W. At 4 P.M. similar.
 8. Band from E. through S. to W., altitude 5° to 15° .
 9.15. Corona in zenith, streamers round heavens scintillating and moving round, disappearing at 9.25.
 10. Band and streamers in N. and N.W.
 MDN. Band of auroral light at E., altitude 6° .
- 20th. 2 A.M. Band from E.N.E. through zenith to W.S.W.
 4. Corona in zenith, with streamers all round heavens, especially towards S. and E.
 4 P.M. Brilliant pale green thick band E. and W.
 6. Five bands across heavens E. through zenith to W., joining at common point each extreme.
 8. Two bands from E. through S. to W., altitude 10° .
 MDN. A few cumulus-like auroral patches in E., W., and S.W.
- 21st. 2 A.M. Band of auroral light at E.; at 4 A.M. in S.E. also.
 8. Corona in zenith, streamers from it to between W. through N and E.
 4 P.M. Arched band from E. through S. to W., altitude at centre 30° .
 6. Arched band from E. through N. to W., altitude at centre 40° .

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8. Faintly defined, but numerous over the whole heavens, chiefly trending from an E. to W. direction.
10. Band from E. through S. to W.S.W.
- 23d. 10 P.M. A few cloudlike and serpentine-shaped auroral patches and bands in zenith, and from W. to S.W., moving bodily to eastward.
- 25th. 8 P.M. Cloudlike streaks and patches of auroral light in S.E., S., and S.W., altitude 10° to 30° .
10. Auroral patches in S.W., N.W., and N.
- 29th. 10 P.M. Auroral bands indistinctly visible amid clouds in zenith from E. to W.
- 30th. 4 A.M. Brilliant streamers, altitude 80° , extending to horizon, pale yellow-green, from N.E. through N.W. to S.W.
- 8 P.M. Cloudlike auroral patches from E. to W. with streamers from them at altitude 30° .

FEBRUARY, 1895

- 1st. P.M. Auroral bands through S. to S.W. with fringes, altitude 10° to 40°
MDN. Faint patches of auroral light at E.
- 2d. 2 A.M. Band at zenith, disappearing behind clouds.
 4. Auroral light on edges of clouds to southward.
 6. Faint auroral band across zenith.
 - 6 P.M. Band and streamers from E. through S. to W., altitude 10° to 40° .
 8. Similar aurora.
- 3d. 2 A.M. Arched band from E.N.E. to W.S.W., altitude 10° in centre, slight patch of auroral light at S.E.
 8. Three faint streamers in zenith extending to W., 45° above horizon. No clouds visible except two lines of perfectly straight cirro-stratus, which could only be seen when the red glow from the sun spread to S.E., S., and S.W., altitude of upper line of cloud 2° .
 10. More layers of cirro-stratus visible as sun's light spread higher above the horizon. At 10.5 straw-colored streamers, fan-shaped, rising from band E. through S. to S.W., altitude 15° to altitude 30° and 40° . At 10.15 streamers collected in group, with circular motion and gathered into circular masses.
- 4th. 2 P.M. Similar straight lines to those of the 3d.
 4. A few straight lines of cirro-stratus at westward, visible in orange-colored light.
- 5th. 6.20 P.M. Brilliant auroral display, commenced by rising in E.N.E., moving slowly through S. to W., pale yellowish-green color. It shot across heavens at altitude 80° to N.E. in about five seconds,

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coloring rose, green, and yellow, recurving in another band through N. across to W., altitude 60° , then lost the prismatic coloring and became straw-color or yellowish-green. At 6.34 P.M. band from N.E. to W. moved, like shooting flame, laterally and with great rapidity, without losing its formation in shape, which was like a deep figure. At the same time the band formed into numbers of circular bands. At 6.37 P.M. band N.E. to W. appeared to rise up in space and move bodily to zenith in southerly direction, growing much fainter at same time and losing nearly all color, becoming like drifting white smoke.

- 10 P.M. Auroral semi-corona in zenith with streamers radiating from it to N.E. through E. and S. to W. A few patches at E., altitude 40° .
- 10th. 8 P.M. Auroral arches from E.N.E. to W.S.W. in northern part of heavens, varying in altitude up to 60° , arched towards zenith.
10. Corona in zenith, streamers radiating from it round heavens. Bands low down from S.E. through S. to S.W.
- 11.15. Observed aurora exactly in the zenith: rapidly moving tongues of tricolored light, yellow, to emerald green, thence to orange and rose, in the order named, the last color formed being rose of two shades. Gradations of all these tints were visible though movement was very rapid.
- 11th. 6 P.M. Auroral bands from E. over N. and through S. to W., with streamers and scintillating fringes.
- 12th. 10 P.M. Streamers at E.
MDN. Broad faint band from W. to zenith.
- 13th. 8 P.M. Brilliant auroral display. Coronas continually forming by streamers shooting up from S.E., then moving to N. and N.E. Streamers and serpentine bands shooting and radiating in all directions.
MDN. Thick auroral band from E. through S. to W.S.W., altitude in centre 15° . Streamers from it forming apex at 90° , having lateral scintillating movement.
- 14th. 2 A.M. Faint auroral patches at E. and N.E.
4. Streamers crossing zenith from N.E. to S.W.
6.30 P.M. Three wavy bands across heavens—from E. through zenith to W.; E. through S. (altitude 70°) to W.S.W.; and E. through N. (altitude 70°) to N.W.; also a band from S. to N.E., altitude 10° ; and a few streamers at E. rising to altitude 20° .
8. A band from E. to S.W., altitude 10° .
10. A band from E. through S. to W., altitude 10° .
- 15th. 6 P.M. Arched bands from E. through N. to N.W., altitude 10° . Thick, forked, wavy band across heavens from E. through N. and N.W., meeting the first at its extreme. Two bands from E.

APPENDIX

- through S. to W., altitude 15° . At 6.15 band across zenith moved laterally to S.W.
8. Large circular fringe of streamers at S.E., altitude 30° , with band to S.W., altitude 10° .
10. Two bands with short streamers from E. through S. to S.W., altitude 0° to 30° .
- 16th. 2 A.M. Faint patches of auroral light at E., altitude 40° .
4. Patches of auroral light from N.E. to S.W. and in E. and S.E.
- 8 P.M. Auroral streamers at S.E., altitude 70° .
- 17th. 8 P.M. A few cloudlike patches of auroral light to S.E., S., and S.W.
10. Thick, wavy band from E.S.E. to W., moving laterally to S., altitude 70° ; streamers at E. 50° .
- MDN. Arch from E. through S. to S.W.; altitude at centre 30° .
- 18th. 8 P.M. Faint wide band from E. to W. across zenith, broken up in places like streamers.
10. Cloudlike patches at S.E., S., and W.
- MDN. Band over horizon from E. to S.
- 19th. 2 A.M. Disconnected band from W.S.W., altitude 5° , to zenith.
4. Bands and streamers from W. to zenith; patches in S.E. and E.
- 8 P.M. Irregular arch from N. to W.N.W., altitude 60° .
10. Disconnected band from E. to N.W. across zenith; streamers at W., altitude 50° .
- MDN. Band from N.E. to S.E.
- 20th. 2 A.M. Irregular auroral band across zenith from E. to W.
4. Irregular band from S.W. to N.E., and band across sky at S.E. and E., about latitude 25° .
- 8 P.M. Brilliant aurora, circular base, altitude 15° , with streamers shooting up to common focus, bearing S., altitude 70° . Band running from base through S. to W. Streamers from it, making for common focus, formed corona in zenith, which broke up at 8.15 into numerous serpentine bands and arches all over heavens, their general direction being E.S.E. to W., and gradually faded away.
10. Disconnected band from E. to S.W., altitude 10° ; short streamers rising up from it to altitude 30° .
- 21st. 8 P.M. Auroral band from E. to S., altitude 5° to 15° .
- MDN. Bands and streamers in zenith, E., W., and N.W.
- 23d. 10 P.M. Band, altitude 20° , partially obscured by clouds, at S. and S.W.
- 24th. 4 A.M. Streamers from N.E. to zenith. At 6, faint band at E.
- 8 P.M. Thick, arched fringe, E. to W., 20° altitude in centre. Faint streamers shooting up from it and forming apex in zenith.
10. Semi-corona in zenith; streamers radiating from it down to hori-

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zon all round heavens, with the exception of between N.N.W. and E.N.E.

25th. 2 A.M. Broad, faint band from S.S.W. to zenith. Narrow, faint band from N.N.W. to zenith.

10 P.M. Thick fringe from E. to S.W., altitude 10° , scintillating and moving laterally to and fro. Sent up streamers to zenith forming apex. Streamers seemed formed in layers, the fringed base forming into thick, circular masses. While on the floe between 9 and 10 P.M. (the night being exceptionally dark) noticed a distinct light, cast on the ice by the aurora.

MDN. Streamers from N. to S.E., altitude 70° to zenith.

27th. 10 A.M. Long arches cirro-stratus from E. to S.W., meeting at horizon in each extreme.

2 P.M. Altitude at centre 10° ; colored dull gray stone; fleecy-white and reddish tints, the lines becoming much thinner as the altitude increased.

10. Short, arched, close fringe of streamers at altitude of 15° from E.S.E. to S.W.

28th. 2 A.M. Similar aurora to that of 27th at 10 P.M., from E.N.E., through S. to W. altitude 20° . Band across zenith from S.W. to N.E.

8 P.M. Wavy, arched band from E.S.E. to W., altitude at centre 30° ; streamers from it forming apex in zenith. Streamers in uneven layers.

10. Corona in zenith. Short streamers from it radiating round heavens.

MARCH, 1895

2d. 8 P.M. Auroral streamers, altitude 60° to zenith, at S., band; altitude 20° S.E. through S. to W.

3d. 10 P.M. Irregular arch from E. to W.S.W., altitude 20° . Streamers from circular cloudlike patch, altitude 15° to 30° , at E.

14th. 12.30 A.M. Corona at zenith, with range to all points of the horizon from which streamers met them.

5th. 11 P.M. Brilliant aurora in zigzag bands from S.W. to N.E.

SEPTEMBER, 1895

24th. 10 P.M. Thin band of aurora to southward, at altitude 50° .

OCTOBER, 1895

5th. 8 P.M. Auroral streamers round heavens, cream-colored and yellow.

11th. 8 P.M. Auroral streamers, commencing at altitude 20° and forming apex in zenith, round horizon.

13th. 8 P.M. Auroral light in openings of clouds at S. and N.W., pale green.

14th. 8 P.M. Auroral streamers at E. rising from horizon to altitude 70° .

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- 19th. 7 P.M. Auroral band, altitude 30° to 40° , with short streamers shooting up from it, E.N.E. and S.S.W.
- 20th. 7 P.M. Similar aurora to yesterday's.
 10 to 10.15. Brilliant auroral display.
 11.30. Broad band E. to W. across zenith.
- 21st. 8.15 to 8.30 P.M. Brilliant aurora, altitude 20° to 80° , N.E. to S.W.
- 26th. 4 P.M. Slight auroral cloudlike light at E.S.E., altitude 10° .
 8.30 P.M. Irregular band of cloudlike aurora, from E.N.E. to W.S.W., altitude 10° to 15° ; short streamers from it.
- 28th. 7.30. P.M. Aurora.
 11 P.M. Aurora, pale green, lateral motion from E. to S.W., altitude 5° to 80° .
- 29th. 8 P.M. Irregular spiral auroral bands from E. across zenith to W.

NOVEMBER, 1895

- 2d. 4 A.M. Auroral streamers S.E. to N.W.
 MDN. One streamer at W., altitude 20° .
- 3d. MDN. One streamer at W., altitude 20° .
- 4th. 4 A.M. Band from S.E. to N.W. across zenith.
- 6th. MDN. Cloud-shaped (cum) auroral light moving from behind stratus cloud from S.W. to S. at altitude 2° .
- 8th. 6 P.M. Streamers from E. to S., 20° to 30° ; one band above the other; lateral motion; pale green.
- 9th. 2 P.M. Pale, short streamer at E., altitude 15° .
- 12th. 2 P.M. Auroral band across zenith from E.N.E. to W.S.W.
 4. Auroral streamer at E.N.E.
 6. Two arched bands from E.N.E. to W.S.W. at altitude 20° to 40° .
 7.55. Streamers at S.E., altitude 10° in center of base, which extended from E.S.E. to W.S.W., of prismatic coloring. Thick streamers were formed in layers towards zenith, pyramidal in shape. It moved towards zenith scintillating, formed corona, long bands and waves of thick rose and green colored light with serpentine movement, sent out streamers to N.N.W., shooting towards horizon, and widening out to N. and W.; finally seemed to rise in space and gradually disappear.
- 10. Three indistinct, cloudlike auroral bands, arched, altitude 10° to 30° E.S.E. to W.S.W.
 MDN. Arched streamer S.W. to N. across zenith.
- 13th. 2 A.M. Cumulus-like patches of auroral light at S. and S.S.W., altitude 70° .
 4. Streamers from N. to S., altitude 45° .
 6. Streamers across zenith, N. to S.
 8. A few streamers at W.S.W., W., and N.W., at various altitudes, suddenly appearing and vanishing.

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- 4 P.M. Five bands of auroral light radiating from common point at altitude 15° , and extending to zenith.
MDN. Cloudlike patches at southward, altitude 80° .
- 14th. 4 P.M. Three auroral bands across zenith from E. to W., meeting on each horizon in common foci.
6. Three similar bands, altitude 20° to 30° in centre.
8.30. Three similar bands, altitude 15° to 30° , from E.S.E. to W.S.W.
MDN. Cloudlike patches at S.S.W. and W., near zenith.
- 15th. 2 A.M. Brilliant corona, streamers from E.N.E. and S.W.
2 P.M. A few pale streamers at N.W., altitude 2° to 10° .
4.10. Brilliant aurora. Eight thick bands from E. to W. gradually opening out to zenith; rapid, lateral movement. Formed corona in zenith with serpentine and circular motion, which sent out some streamers to N.E. The main bands did not pass the zenith, but after playing about in all directions grew very faint.
4.30. Brilliant prismatic coloring in fringes of bands. All bands met in common foci at E. and W.
5. Aurora appeared more distinctly and spread over all heavens in bands, and in circular and scroll-like forms.
6. Band across zenith from E. to W.; very faint arch at N.W. formed by short fringe of streamers.
- 16th. 8.25 P.M. Long arched band of streamers from E.S.E. to W.S.W., lateral movement W. to E.; altitude at centre 20° ; prismatic coloring.
10. Huge mass of streamers from common point at E. up to zenith and round to S.W., like column of smoke.
- 18th. 2 A.M. Streamers at W. and N.E.
4. Streamers at S.W. Faint corona in zenith.
MDN. Faint broad streamer E.N.E. to zenith.
- 19th. 2 A.M. Streamers over whole of heavens; corona.
4. Faint streamers N.E. to S.W.
6. A few auroral patches at W. Band across zenith from N.E. to S.W.
9 P.M. Brilliant arch of auroral streamers from E. to S.W.; altitude at centre 40° .
10. Fringed band from E.S.E. to S.; altitude 10° .
- 20th. 2 A.M. Two streamers at S.W.
4. Faint streamers from N.E. to S.W.
6. Faint band E. to W.
6.15 P.M. Three fringed bands with streamers shooting up towards zenith to altitude 60° , pulsating and moving laterally from S. to E.
10.15. Arched fringe of streamers from E. to S.W., altitude at centre 20° ; another band under S.W. extreme of fringe, and separate from it.
MDN. Brilliant streamers all over sky.

APPENDIX

- 21st. 6 P.M. Aurora commencing in band of streamers from E.N.E. to S.W., shooting upwards to zenith, forming pyramidal shape and corona, which shot out streamers all over heavens, and finished as it commenced in band from N.E. to S.W.
- 8.10. Intermittent streamers from N.E. to S.W., altitude 45° .
10. Long irregular fringe of streamers from E.N.E. to W.S.W., altitude at centre 12° .
- 22d. 2 P.M. A few streamers at N.W., altitude 10° . to 40° .
4. Irregular bands of streamers from W. to E.N.E., altitude at centre 60° .
6. One streamer at W.N.W.
8. Faint band from E. to S.W., altitude 20° .
10. A double band of fringed streamers from E. to S.W., altitude 5° to 10° .
- MDN. One streamer at E.
- 23d. 2 A.M. Brilliant corona with streamers from it all round heavens.
4. Corona in zenith. Streamer from it to N.
- 4 P.M. Band from E. to S., altitude 10° to 20° ; streamers at E.
6. A band from S.E. to S.W., altitude 10° .
8. Cloudlike auroral light at E., altitude 5° .
10. Bands, altitude 10° to 15° , from E. to S.W.
- MDN. Streamers at zenith, S.W. and S.
- 24th. 2 A.M. Streamers at S.W.
6. Streamers radiating from zenith all round horizon, down to 10° from horizon.
8. Streamers at S. and S.W.
- NOON. Faint arch from E.S.E. to S.W., altitude at centre 15° .
- 2.40. P.M. Brilliant aurora, spiral-shaped from W. to E., darting like flame from E. to W., opened out to N. and S. in several bands, sent out streamers from E. through N. to W., extending to 10° altitude at 2.45.
- 2.50. Formed complete corona, soft green color throughout, spiral shape, very thick. Observed stars of small magnitude, and gave faint but distinct light.
3. Broad mass of auroral light from E. to W. across zenith.
6. Broad band from W. to N., altitude 3° to 20° .
8. Streamers round heavens to 10° from zenith. Thick base, altitude 10° to 20° . All stars (except "a Coronae") of Corona Borealis obscured by one thick patch of auroral light.
10. Corona and brilliant streamers (pale green) all round heavens in successive layers, one above the other, especially to E., S., and W. The Pleiades dimmed, but not obscured, by this aurora.
- 25th. 2 A.M. Streamers at S.W.
4. Streamers at S.W.

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6. Streamers at zenith, broad band from S.W. to N.E.
- NOON. A few small streamers at N.W.
2. P.M. Bands across zenith from W. to N.
4. Streamers at N.E., extending to 10° from zenith.
10. Brilliant corona in zenith, soft green colors; sent out one long streamer to E. and another to W., which spread out to N.E. and S.W., and at 10.12 had spread all round heavens, leaving a thick track of light in its path at base of streamers as it moved along.
- 26th. 4 P.M. Two auroral bands from E. through S. to W.S.W., altitude at centre 20°
8. Cloudlike patch of auroral light moving bodily from E. to S. and sending out a fringe of streamers back to E.; varicolored.
- 28th. 8 P.M. Streamers at N.W.
- 30th. 4. Arch from E.S.E. to W.S.W., altitude in centre 10° ; very faint.
6. Similar aurora.

DECEMBER, 1895

- 8th. 2 P.M. Streamers from between E.S.E. and W.S.W., fan-shaped, visible between 20° and 70° altitude; base and apex obscured by clouds.
- 11th. NOON. Streamers at N. and N.W., altitude 10° to 70°
- 2 P.M. Fringe of streamers from N.W. to N., altitude 10° to 50° .
4. Similar aurora.
- MDN. Broad faint streamers at N.N.W and S.W.
- 12th. 2 A.M. Streamers from W. to E., altitude 10° .
- 4 P.M. Numerous disconnected streamers from W. to E., across zenith, moving bodily to southward.
6. Arched band, streamers from it E. to W., altitude 15° .
8. Disconnected band, or arch, of streamers from E.S.E. to W.S.W. at altitude 15° .
- 12th. MDN. Streamers at S.E., S., and S.W.
- 13th. 2 A.M. Faint auroral light at S.S.W., streamers at S.W.
- 14th. 4 to 6 P.M. Brilliant arch of streamers from E. to W. Altitude of centre at 4 P.M., 10° ; at 4.40 P.M., 60° , where it remained until 6 P.M., pulsating both ways; prismatic coloring constantly renewed. The aurora cast a faint but distinct light, making the rocks of Cape Flora and the clouds show out more distinctly than is usual. It also caused an ill-defined, faint shadow.
- 15th. MDN. Faint streamers at E., altitude 40° .
- 17th. 2 P.M. Fringe of streamers from W.N.W. to N., altitude 30° .
4. Three arched bands, one in zenith, two at altitude 30° E. to W.
8. Brilliant display, corona at zenith, streamers all round to 5° and 10° from horizon, circular masses at base, prismatic colors, faint diffused light, apparently blown to S.W. by wind, force 10.

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10. Arched band of light from E. to W., 40° at centre.
MDN. Brilliant streamers from E.N.E. to S.W. through zenith.
- 18th. 4 P.M. A few streamers W.N.W. from 4 to 8 P.M. Two arched bands from E. to W., altitude at centre 15° , occasionally sent up streamers towards zenith.
10. Brilliant corona at zenith with circular motion, sending out streamers and vast sheets of light at E., moving slowly and bodily towards E., fringe of streamers from E. through S. to W.S.W., altitude 20° .
MDN. Brilliant streamers from E.N.E. through zenith to W.S.W.
- 19th. 2 A.M. Broad faint streamers at S.
4. Faint band at S.E.
6. Band of streamers from N.E. to zenith.
8. A few long streamers from horizon towards zenith, N. and N.W.
2 P.M. Band of streamers across zenith from E. to W.
MDN. Luminous patch at W.
- 20th. 2 A.M. Streamers from E.N.E. through S. to W.
4. Faint band at S.E., and faint streamers near zenith N.W. of it.
4 P.M. Arched band from E. to W. Centre passed over Cassiopeia. Another forming slightly N. of it.
6. Two wavy arched bands from E. to W. across zenith.
10. Circular mass of streamers, altitude at base 3° , top of streamers 23° , from S.E. to S.W., lateral pulsating motion towards *both* extremes; cast faint light.
MDN. Very faint luminosity from E. to W. through S., altitude 8° .
- 21st. 2 A.M. Similar aurora.
MDN. Short streamers from E.N.E. to W., altitude 5° .
- 22d. 6 A.M. Faint corona in zenith, short streamers from it round heavens.
8. A few short streamers at N.W., altitude 15° .
10. Faint corona in zenith with long streamers to E. and W.
NOON. Broad mass of auroral light from E. horizon to zenith.
2 P.M. Auroral bands from E. through S. to W., variable altitude 5° to 60° ; at 4 P.M., altitude 20° to zenith.
8. Five wavy bands from W. to E.; the lowest at N., altitude 40° at centre; altitude of lowest at S. centre, 70° .
MDN. Streamers at W., altitude 5° .
- 23d. NOON. Irregular wavy band of connected streamers from E. across zenith to W.
4 P.M. Thick wavy band from E. to W. across zenith.
10. Brilliant display; corona at zenith sending out vast sheets of light to southward and eastward, streamers in other directions. Fringe of streamers moving with exceeding rapidity laterally through N. to E. at altitude 40° , recurving again towards N. Brilliant prismatic colors.

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- MDN. Streamers at W., S.W., and S. altitude 6°.
- 24th. 2 A.M. Faint broad patch at S.
4. Faint corona at zenith, with short streamers round heavens.
 6. Faint band from E. to W.
 8. A few streamers at N. and W.
- 10 P.M. Irregular cumulus-like auroral patch at zenith. A few short streamers at E. and S.E., and one band.
- MDN. Faint auroral patch at W.
- 25th. 4 A.M. Faint streamer at zenith.
- 26th. 2 A.M. Auroral band E. to W., altitude 10° at E., 15° centre, horizon at W.
6. Streamers from N. to W., and at S.W.
 8. Faint streamers at N.W., altitude 50°.
- 2 P.M. Arched band from W. through N. to E.N.E., altitude 40° at centre.
6. Arched fringe of streamers from E. to W., altitude 50° at centre.
 8. Faint band from E. to W.
 10. Three disconnected arched bands from E.S.E. to W.S.W., altitude at centre 5°. Low bank of cloud at W.
- 27th. 2 A.M. Streamers at S.W.
8. Two irregular-shaped auroral patches at zenith, with a few short streamers from them: appearing about to form corona.
- 31st. 10 P.M. A short, faint streamer at S.

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- 2d. 2 P.M. Arched band from E. through S. to W., altitude 80°.
4. Similar aurora.
 8. Circular mass of auroral light at S.E., altitude 40°.
- MDN. Streamers at W.S.W. through zenith to E.
- 3d. 4 A.M. Auroral bands thickly massed across zenith, especially from E. to W.
- 4 P.M. A few streamers at S.E., altitude 18° to 50°.
 8. Wavy band from W. to E.S.E., altitude 5° to 20°.
- 4th. 2 A.M. Thin band at zenith from N. to S. Faint streamers W. through S. to E., altitude 30°.
6. Streamers radiating in every direction from zenith, especially to E. and W.
 8. A few cumulus-like patches at N.W. and short streamers at N. and N.E.
- 2 P.M. Semi-corona at zenith, with layers of thick streamers to between E. and W.
4. Broad, wavy mass of light from W. to E., moving rapidly and bodily to S.
 6. Arched band from E.N.E. to W., altitude 20° at centre.

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10. Faint circular masses of auroral light from zenith to horizon between N. and W.
MDN. A few short streamers at S.E., altitude 5° to 10° .
- 6th. 2 P.M. Faint, irregular bands from E. to W. across zenith.
6. Auroral light showing on a ragged edge of cloud.
- 10th. 6 A.M. Broad, faint band from E. to W.
2 P.M. Broad, thick, irregular band from E. to W. across zenith. Breadth from Polaris to Vega appearing to rise and move laterally to southward.
6. Bands from E.N.E. to W.S.W., altitude 20° to 40° .
8. Auroral light in large, faint patches in zenith and on edges of clouds to S. and S.E. At 10 P.M. light on edges of cloud to E. and S.
- 11th. 4 P.M. Irregular, thick, arched band from W. through Ursa Major (below the pole) to E.N.E.
MDN. Faint patches of aurora in zenith.
- 12th. 2 A.M. Streamers between S. and E., altitude 5° to zenith; misty on horizon to southward. Brilliant, irregular streamers covering heavens with exception of 2° above horizon.
6. Faint streamers at W.
2 P.M. Thick, wavy bands from W. through zenith to E.
4. A few streamers to N. and N.W.
10. Auroral light on edges of clouds to southward.
MDN. Faint patches at W., N.W., and E., altitude 5° .
- 13th. 2 A.M. Streamers over whole heavens from 2° above horizon.
8 P.M. Arched band from E. to W.S.W., altitude 15° at centre; short streamers rising from it to altitude 30° , appearing to make for common point in zenith.
10. Similar aurora.
- 14th. 2 A.M. Corona in zenith; streamers from it at E.N.E. and S.
4 P.M. Arched fringe of streamers from E. to S.E., altitude at S.E. 20° .
6. Similar aurora in different layers.
10. Corona at zenith; streamers radiating round heavens from it to 20° above horizon.
MDN. Auroral lights at S.W., altitude at 30° . Faint light on edges of cloud at S.
- 15th. 2 A.M. Fringe of streamers through S. to E.N.E.
6. Faint streamers at zenith to W.S.W.
8. Streamers at N. and N.W., radiating from zenith to 30° above horizon.
NOON. Streamers at N., N.W., and N., extending in detached layers to horizon. At 2 P.M. similar aurora.
4 P.M. Thick curved band from E. across zenith to W., and thick

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- circular patch at zenith apparently composed of streamers moving bodily W. and into space. At 8 P.M. similar.
10. Corona at zenith having circular motion, short streamers radiating from it round heavens and moving bodily to S.E.
MDN. Arched band from W.N.W. to E.N.E., altitude at centre 50° .
 - 16th. 2 A.M. Faint auroral light at S. at edge of cloud just above horizon.
 - 17th. 6 A.M. Faint corona at zenith.
 8. A few streamers at N. and N.W.
 - 4 P.M. Bifurcated band from E. through S. to W., altitude at centre 20° , streamers at each extreme. Arched band from E. through N. to W., altitude at centre 70° .
 6. Most brilliant aurora. Circular masses at W.S.W., shooting out thick bands and streamers to E.N.E. Fringes bright green or deep rose, recurring, scintillating, darting, and moving like running water both ways. Corona in zenith. Aurora commenced at 5° above horizon, and had more color than any we have yet seen. It threw out a more distinct light than any yet recorded. Once or twice the colors appeared to be deep rose, mauve, and purple. It was most brilliant during twelve minutes shortly after 6 P.M. The magnet suspended in the magnetometer vibrated quickly both ways.
 8. Wavy irregular band across zenith from W. to E., curving towards N. near E. horizon.
 10. Faint corona, faint streamers radiating from it round heavens.
 - 21st. 4 A.M. Faint band at S.E.
6 P.M. Band, altitude 15° ; streamers each extreme at E., N.E. and S.
 - 22d. 4 A.M. Band from E. through S. to W., streamers from it towards zenith.
MDN. Faint light above frost smoke. Streamers at N.N.W., altitude 20° .
 - 30th. 10 P.M. Streamers at E. and N.E., moving rapidly northward, altitude 70° . Very indistinct because of moon's light.

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- 3d. MDN. Bright patch above, and appearing from behind stratus cloud from E. through S. to W. Irregular band of streamers from N. through zenith to S. A streamer from E. to W., altitude 10° .
- 4th. 6 P.M. Circular masses and fringed bases all round heavens, altitude 10° .
10. Faint aurora, streamers radiating round heavens, heavy circular bases at altitude 10° .
- 5th. 2 A.M. Streamers from W. to E.N.E., rapid movement. From 4 to 6 A.M., streamers at W.

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- 6 P.M. Arched bands from E.N.E. to W., altitude 10° to zenith, indistinct.
- MDN. Streamers at S., altitude 7° .
- 6th. 6 P.M. Irregular, disconnected band from E. across zenith to W.
8. Broad band from E.N.E. across zenith to W., another through S. to W., altitude 60° .
- 7th. 2 A.M. Faint streamers from zenith to 5° above W. horizon.
4. Similar aurora, very faint.
- 10 P.M. Corona in zenith, streamers radiating from it to between E.N.E. and W.S.W. (through E. and S.) down to 10° above horizon. Short streamers extended 3° from zenith to other portions of heavens. Streamers at E. very thick. Heavy circular bases at westward.
- MDN. Streamers from E. through S. to W., altitude 35° .
- 8th. 2 A.M. Streamers at S.
- 8 P.M. Brilliant aurora. Streamers from E.N.E. through E. and S. to W.S.W. gradually extended to and formed corona in zenith. Streamers thickest at E. extreme. Corona formed against the watch by sinuous, circling bands. It sent out streamers to N.W., other streamers folding round from E. to W. towards N.W. The whole appeared to move bodily from S.E. to N.W. laterally, and pulsating both ways. Various shades of green in color. Magnetic needle barely affected. Aurora apparently distant. Aurora similar to this formed between 8 and 10 P.M.; as one faded another came on.
- MDN. Streamers from E.N.E. to S.W., altitude 5° .
- 9th. 2 A.M. Streamers from E.S.E. to N.N.E.; patch at N.W., altitude 2° , and at S.S.W., altitude 3° .
4. Streamers from E. to W., altitude 20° .
- 10th. 2 A.M. Faint streamers at S., altitude 40° .
6. Streamers from N.E. to S.W., and from N. to zenith.
- 11th. 8 P.M. Corona at zenith, streamers radiating round heavens from it at 10° to 20° from zenith.
10. Auroral arch, altitude 30° , from S.S.E. to W.S.W.
- 13th. 4 A.M. Streamers at S., altitude 20° .
6. Auroral patch at S., streamers from S. towards zenith.
- 14th. 2 A.M. Streamers radiating from behind stratus clouds all round the horizon and forming a corona at zenith.
4. Faint corona at zenith, streamers at N.
6. Streamers from S.W. and N.E. towards zenith, quickly disappearing and being reproduced. Very clear round horizon.
- 6 P.M. Fringed base of streamers round heavens at 10° to 30° altitude. Indistinct streamers at E.N.E. extending to zenith, lateral motion from east to west.

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8. Two faint arches from E. across zenith to W.
MDN. Streamers at S., altitude 60° .
- 17th. 6 P.M. Band across zenith from E.N.E. to W.S.W.
8.10 to 8.30. Brilliant aurora. Corona at zenith faded away quickly.
Four bands apparently commenced at W.S.W., altitude 5° , and spread round through S. to E., altitude at E. 60° , through N., meeting two other bands which commenced at W., altitude 5° , and spread round to N. at altitude 50° . The bands from W. to N. moved laterally. They formed into a sinuous band at W. and moved with great rapidity from N. to S., and then curved rapidly towards W., all the bands being fringed. Could barely distinguish very faint streamers rising from the bands.
- 19th. 6 P.M. Broad band from E.N.E. through N., altitude 70° to W.N.W.
8. Faint band across zenith from E. to W.
- 29th. Irregular bands of auroral light from E. to S., altitude 5° to 20° .

SHORT STATEMENT UPON THE GEOLOGY OF FRANZ-JOSEF
LAND. BY REGINALD KOETTLITZ, M.R.C.S., L.R.C.P., ETC.,
OF THE JACKSON-HARMSWORTH POLAR EXPEDITION.

THAT Franz-Josef Land is not the extensive land that it was supposed to be by Payer and Leigh Smith will be gathered from Mr. Jackson's narrative. We now know it to be nothing more than an archipelago of small islands. (See paper in *Quarterly Journal Geological Society*, vol. liv., p. 620, 1898.)

The geology of these islands teaches us that they are the remains of a fairly extensive table-land, which there is every reason to believe was once connected with other land, from which it is now separated by a considerable expanse of sea.

The most conspicuous rock, and the one that first strikes the visitor to these shores, is the basalt, which gives the country its distinctive flat-topped, table-land character. This crowns those spots which the perpetual ice and snow does not hide. It is a fine, black-looking rock, arranged for the most part in layers or tiers, which are very distinct and can be seen at a great distance upon the headlands and few protruding rock masses. I use the word *few* because the surface is almost entirely covered by ice, and it is only at rare intervals that a bare spot can be seen.

Upon close examination the layers or tiers, which represent successive flows of basalt at varying intervals of time, are seen to be separated by layers of softer material, which weathers and crumbles more readily than the harder rock; the result being that the tiers rise one above another in a succession of terraces, which are high or low according to the thickness of the bed. The total thickness of these basaltic layers is about 700 feet; its base is generally from 400 to 600 feet above sea-level, and its upper limit, in some places, is not far short of 1300 feet.

Nearly all the basalt—at least of the southern and western portions of the land—is of the same type. Mr. J. J. H. Teall, of the Geological Survey, who has carefully examined and reported upon it (*Quarterly Journal Geological Society*, vol. liii., p. 482), defines it as consisting of “glomeroporphyrritic aggregates of basic plagioclase and augite, in a ground mass of lath-shaped labradorite, augite, and interstitial matter.” Some of this is massive and compact, but much of it is vesicular and amygdaloidal, the amygdaloids being formed of palagonite calcite, analcime, natrolite, chalce-

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dony, and quartz. Underlying this basaltic rock, extending from sea-level to, in some places, 600 feet above, are strata of soft clay-shales, sand, coal, and lignite, with an occasional boss in it of hard sandstone. Among them also occur strata of a foot or two in thickness of sandstone, or ferruginous mud-stone, and at one spot of bituminous paper shales.

Many of these strata contain fossils, both plants and animals, many of which have been identified by Mr. E. T. Newton, of the Geological Survey (see *ibid.*, p. 493). The strata around Cape Flora yielded Ammonites (*Cadoceras*) Tchekini, *A. modiolaris*, *A. (Macrocephalites) Macrocephalus*, *A. Lamberti*, *A. Ishmæ*, *Belemnites Panderi*, as well as other species; *Pecten demissus*, *Aviculæ*, a new *Inoceramus*, etc.

Near the sea-level at Cape Stephen a bed filled with plant-remains was met with, and these have been referred to *Phyllothea*, *Rhiptozamites* (?), *Anomozamites* (?), *Zamiopteris*, and *Asplenium*. A coal seam some two to three feet thick was found near here, at about 300 feet above sea-level.

Fossil plants were also discovered in some stratified rock between the tiers of basalt, associated with the coarse material which composed the softer layers between the tiers, which have been referred to above.

Some of these plants Dr. Nansen, who was with us for seven weeks, brought back with him, and they were examined by Dr. Nathorst. They consist of pine-needles and seeds, ferns, two species of ginkgo (one new etc., such as *Pinus* like *Nordenskiöldi*, another species with narrow needles and seeds like those of *Pinus Maakiana*, *Taxites*, probably *T. grammineus*, *Feildenia*, *Ginkgo* (new), named *polaris* (Nath.), another *Ginkgo*, *Czekanowskia*, *Cladophlebis*, *Thyrsopteris* (?), *Onychiopsis* (?), and *Asplenium*, near to *A. petruschinense*.

The stratified rocks beneath the basalt are remarkable for their extraordinary number and diversity of color; for the most part they are layers of clay-shale, and sand with lignite; much of the latter is false bedded also, and points to frequent oscillations of level and rapidly varying conditions of deposition.

The lowest beds found are a series of shales and sandstones containing fossil plants and lignite, showing evidence of littoral or estuarine conditions. Above these are some of purely marine formation, containing the above-named Ammonites, *Belemnites*, etc., which seem to be intimately associated with the more shallow water-beds. These marine fossils are so characteristic of special zones that the age of these beds is fairly well established to be that of the Callovian and Oxfordian of the Jurassic period.

The finding of *Ammonites macrocephalus* in Franz-Josef Land extends the range of this ammonite several degrees more to the north than it was previously known to occur; and the plant-bearing beds, in association with those containing this ammonite, show that a coast-line at no very great distance must have existed.

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These soft rocks therefore, known to be of Jurassic age, were subsequently covered up by successive flows of basalt, and the question arises as to when these flows took place, and whether they were deposited upon the surface as lava, or whether intruded between older strata as intrusive sills.

Contrary, I believe, to the opinion of others who have examined the specimens brought home, I consider them to be of Jurassic age. Having had the advantage of examining the rocks *in situ*, I have gained a clearer conception of their conditions than can be possibly obtained by description. My reasons for thinking them of this age, and not Tertiary, like the basaltic formations of Scotland, etc., are:

- (1) That the lowest bed of the series has tuff-like material underlying it; so have also other tiers, which proves the flow to have been sub-aerial and not intrusive.
- (2) The layers of basalt are vesicular on their upper and lower surfaces and compact in the centre, which also points to non-intrusion.
- (3) In the middle tiers of the basalt I have discovered large masses of fossil-wood enclosed in it, and also wood charred into charcoal.
- (4) The stratified rock between the tiers being only thin strata, continue so level, and show so little evidence of displacement, that they must have been laid down where they now are, and it appears impossible that the basalt could have been intruded underneath them.
- (5) That in association with these stratified beds are layers of tuff.
- (6) Where the basalt is in contact with these stratified rocks they do not appear to be materially altered by heat.
- (7) That in these strata I found fossil plants which are considered to be of Upper Jurassic age.

These reasons appear to me to be conclusive as to their age, if the date assigned to the fossil plants be correct.

The basalt at certain spots is to be found at sea-level, and appears to be the remains of dikes, while at another place it looks like a neck which originally filled a volcanic vent, through which the lava found its way to the surface.

The evidence of considerable elevation of the land above sea-level at a comparatively recent date is very marked, the more recent being shown by a continuous series of terraces of beach lines covered with rounded, rolled, water-worn stones up to a height of over 400 feet: these are especially well shown upon Bell Island. Upon many of these raised beaches the remains, in the form of bones, of seal, walrus, and whales are to be found.

But higher still, even to the summit of the rocks, the highest position

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being the summit of Cape Flora, 1111 feet in height, rolled, rounded water-worn stones are also to be seen, and even, as on the plateau upon the top of Cape Neale, 700 feet high, the whole skeleton of a seal was found. As a consequence of the more lengthened period since these higher parts of the land rose above the sea, the proofs of their having been under sea-level are not so marked as on the lower land, the rocks and rounded stones having been much weathered and broken up since. Seeing, however, that some raised beach-terraces are unmistakable for half the distance in altitude, and that there are similar conditions at all altitudes, it is tolerably clear that in comparatively recent times the whole land surface has risen from below sea-level.

The geological facts discovered show that, during the time the basalt was being poured over the surface, the climate was very different to what it is now: trees and plants were growing upon it, luxuriant verdure clothed the surface, and, judging by the species and genera of plants, the climate was cool but mild and genial.

It was at the same time connected, in all probability, with other lands, most likely, judging by the similarity of the basalts, with Spitzbergen, Scotland, Ireland, the Faroe Islands, Iceland, Jaulleayan, and Greenland.

There is a possibility that the land was at an earlier epoch connected with northern Europe and Siberia.

NOTES ON A COLLECTION OF ROCKS AND FOSSILS FROM
FRANZ-JOSEF LAND, MADE BY THE JACKSON-HARMS-
WORTH POLAR EXPEDITION DURING 1894-1896. BY E. T.
NEWTON, ESQ., F.R.S., F.G.S., AND J. J. H. TEALL, ESQ.,
M.A., F.R.S., V.P.G.S.*

I. INTRODUCTION

THE steamship *Windward*, which has now paid two visits to Franz-Josef Land, brought back last year (1896) a series of rocks and fossils, collected by the Jackson-Harmsworth Expedition. This collection, by far the most important which has reached this country from Franz-Josef Land, was forwarded to the Geological Survey, and at the request of the Director-General, Sir Archibald Geikie, we have undertaken its examination. Although the full results of the geological observations recorded by Dr. Koettlitz cannot be made known until the return of the expedition, it has been thought desirable that a preliminary account of the district, based on the specimens already received, should be published.

II. PREVIOUS WORK ON THE GEOLOGY OF FRANZ-JOSEF LAND

The geological literature relating to Franz-Josef Land, though small in amount, is sufficient to prove that those portions of the district which have as yet been visited possess a comparatively simple geological structure. Scattered observations have now been made over more than two degrees of latitude by Payer, Leigh Smith, Jackson, and Nansen, and everywhere the features observed appear to be essentially of the same character. It is a region of plateau-basalts comparable, not only in its main features, but also in many of its minor details, to portions of the western coast of Scotland. Vast flows of basaltic lava, associated in all probability with intrusive sills of the same type of rock, form the greater portion of the district. Sometimes the basalt descends to the level of the sea, and sometimes, as at Cape Flora, rests on some 600 feet of nearly horizontal strata of Jurassic age. It may be safely predicted that if the capping of snow and ice which conceals so large a portion of the district were

* Extracted by permission from the *Quart. Journ. Geol. Soc.*, vol. lii., p. 47 (1897). See also same journal, 1898, p. 646.

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cleared away, the geological aspect and physical features of Northbrook Island would be very similar to the northern part of the Isle of Skye, where basaltic lavas and intrusive sills are associated with nearly horizontal strata of Jurassic age.*

The geological observations made by the members of the Austro-Hungarian Polar Expedition under the command of Lieuts. Payer and Weyprecht were necessarily of a limited character. Payer calls attention to the plateau-like aspect of the land in the neighborhood of Cape Tegethoff, the southern promontory of Hall Island, and to the fact that the plateau terminates with steep, precipitous rocks.† He refers also to the occurrence of dolerite (the general term applied to the rocks by Prof. Tschermak) on Koldevey and Schönnau Islands, that of the latter being remarkable for its beautiful columnar structure. He states generally that dolerite is the prevailing rock, but refers also to the occurrence of sandstones and of a shale containing white mica and plant-remains. There is no means of correlating the latter rocks with the beds discovered by Dr. Koettlitz, of the Jackson-Harmsworth Expedition. The common occurrence of silicified wood is also noticed by Payer, and wood of this character is abundant in the present collection. The ship *Tegethoff* was abandoned, and only a few specimens appear to have been brought back. In his general remarks on the geology of Franz-Josef Land, Payer clearly recognizes that it forms a part of an extensive volcanic province, stretching westward through Spitzbergen, Jan Mayen, and Iceland to Greenland.

The voyages of Mr. Leigh Smith in the *Eira* furnish additional information of importance as to the geology of Franz-Josef Land. From the account of the first voyage in 1880, given by Mr. (now Sir) Clements R. Markham,‡ we learn that May Island, the first land reached, is 200 feet in height, and formed of basalt. Cape Barents, the southeastern promontory of Northbrook Island, is formed of "columnar basalt like the Giant's Causeway." It is stated that while the ship was in Eira Harbor, Mr. Grant walked along the shore to the eastward, presumably on Mabel Island, and afterwards ascended with a party to the summit of the hill overhanging the harbor (Bell Island?), which proved to be 1040 feet above the sea. "On the slope of this hill a good deal of petrified wood was collected, and some other fossils." It is further stated that "the lowest rocks belong to the Oxford clay, and are represented in the collection brought home in

* See "The Tertiary Basalt-plateau of Northwestern Europe," by Sir A. Geikie. *Quart. Journ. Geol. Soc.*, vol. lii., p. 331 (1896).

† *New Lands within the Arctic Circle*. See also *Proc. Roy. Geogr. Soc.*, vol. xii. p. 17 (1874).

‡ See the account of the voyage by C. R. Markham, *Proc. Roy. Geogr. Soc.*, n. s. vol. v., p. 204 (1883).

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the *Eira* by two belemnites. Above the Oxford clay the rock is of the Cretaceous period to which the fossil coniferous wood belongs, including one very perfect cone. There are also slabs with impressions of plants. Over all these has been an overflow of basalt and lava, forming a cap, as on the island of Disco." In the discussion which followed the reading of the paper, Mr. Etheridge referred to the widespread distribution of the basalts, which he regarded as being probably of the same age as those of the Giant's Causeway.

During the second voyage of the *Eira*, in 1881, which unfortunately terminated in the loss of the ship, a raised beach, 90 feet above sea-level, was found in Gray Bay, and cliffs of columnar basalt, 800 feet in height, were observed at the same locality.* Fossil wood was found on David Island.

Dr. Nansen's book, *Farthest North*, contains many references to the geology of the parts of Franz-Josef Land visited by him. The first rock touched in his memorable journey towards the south is described as a coarse-grained basalt,† and he refers to the occurrence of basalt on the western coasts of Karl-Alexander Land and Frederick Jackson Island; also at Capes McClintock, Fisher, and Richthofen. In justice to Mr. Jackson it should be remembered that he had visited most of these localities in 1895, and had observed the occurrence of basalt.

In many places the rock exhibited the characteristic columnar structure in the most perfect manner. While staying with Jackson at Cape Flora, Dr. Nansen examined the geological structure of the neighborhood of that cape, the points of interest being shown to him by Dr. Koettlitz, the doctor and geologist of the English expedition. The basalt appears at a height of 500 or 600 feet, and below this is a soft clay containing lumps of an argillaceous sandstone, in which fossils occur. At first Dr. Nansen held the view that the stratified deposits belonged to a late beach-formation, but Dr. Koettlitz showed him that these deposits actually passed underneath the basalt. Dr. Nansen also observed thin strata of basalt in the clay, below the main mass. The fossils were mainly ammonites and belemnites, and these convinced him that they belonged to the Jurassic period. The main mass of basalt was coarser in grain than in ordinary basalt, and resembled the so-called "diabases" of Spitzbergen.

Dr. Nansen points out that the situation of the basalt on Northbrook Island is different from that which had been observed farther north. Here it was found at a height of 500 or 600 feet, whereas north of latitude 81°, at Capes Fisher, McClintock, Clements Markham, and many other localities, it descended to the sea-level. He regards the basalt as in great part of Jurassic age.

* *Proc. Roy. Geogr. Soc.*, n. s., vol. iii., p. 129 (1881).

† Vol. ii., p. 306. In his diary the rock is called a granite, but in a foot-note he adds that it was a coarse-grained basalt.

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Mr. Jackson and Dr. Koettlitz discovered innumerable fragments of rock, containing plant-remains, resting on a mass of basalt which, at a height of more than 700 feet above the sea, projected through the glacier on the north of Cape Flora. Dr. Nansen was taken to this spot by Dr. Koettlitz, and they brought away a number of specimens, some of which were submitted to Dr. Nathorst, and determined by him to be of Upper Jurassic age. The fact of these fossils having been found on the basalt also influenced Dr. Nansen in referring this rock, in part at least, to the Jurassic period. Evidences of recent changes in the relative level of land and sea are referred to in Dr. Nansen's book. Thus, Mr. Jackson's hut is built on an old beach 40 to 50 feet above sea-level, and other beaches were found at still greater elevations. Raised beaches were also observed farther north, in the neighborhood of the hut in which Dr. Nansen wintered.

A number of geological specimens were sent home by Mr. Jackson and his party when the *Windward* returned in 1895, and a short note on some of these was appended by our colleague, Mr. G. Sharman, and one by us to Mr. Montefiore Brice's report of the expedition.* The much larger series of specimens, of both rocks and fossils, which has now been received throws additional light on the geological structure of the Franz-Josef Land archipelago. Although the cliffs are so largely hidden by talus-heaps and snow that exposures of rock are few and far between, yet the specimens now collected by Mr. Jackson's party have all been so carefully labelled and localized that it has been possible to piece them together, so as to present what we believe to be a correct idea of the geology of some of the southern parts of Franz-Josef Land. We have received much help from Mr. H. Fisher, the botanist of the expedition, who is now in England; his admirable colored sketches and verbal descriptions doing much to aid us in realizing the actual conditions under which the specimens were found. Moreover, Mr. Fisher's patience in answering our innumerable and perplexing queries has helped us out of many difficulties, and we take this opportunity of tendering him our warmest thanks. We are also under obligation to Dr. G. J. Hinde for many hints, but especially for his note on the radiolarian chert from the iceberg. We have, moreover, received help and many kind suggestions from our colleagues, Mr. Clement Reid, Mr. G. Sharman, and Mr. W. W. Watts, and we desire to thank all these friends and to acknowledge our indebtedness to them.

III. THE BASALTS OF FRANZ-JOSEF LAND

The basaltic rocks which form so important a feature in the geology of Franz-Josef Land are well represented in the Jackson-Harmsworth collection by specimens from Cape Flora and Hooker Island. All these belong

* *Geogr. Journ.*, vol. vi., p. 518 (1895).

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to one type, although the specimens may be massive, vesicular, or amygdaloidal; but another and a distinct type is represented by one or two specimens obtained from the under-surface of an iceberg found, tilted up, in De Bruyne Sound, between Northbrook and Hooker Islands.

The common type will first be described. It is represented by specimens collected *in situ*, and from the talus which so commonly conceals the lower portions of the cliffs. As there is no essential difference between the specimens collected under these different conditions, they will be grouped together for purposes of description. In the fresh condition the rocks are very dark, almost black, and of medium grain. They weather in the manner characteristic of basaltic rocks, and sometimes break up into spheroids. Examined with a lens, the feldspars are often seen to be of a yellowish color, and the appearance of the rock under these circumstances is such as to suggest at first sight that olivine is an important constituent. This, however, is not the case; olivine does occur occasionally, but never in sufficient quantity to affect the macroscopic character of the rock.

A special feature of almost all the rocks of the common type is the tendency of some of the feldspars to be somewhat larger than the others, and to occur in groups, thus producing a kind of glomero-porphyrific structure. A few specimens may be fairly termed "porphyritic basalts," but the porphyritic structure is never strongly marked in the hand specimens, and is frequently not noticeable.

Vesicular and amygdaloidal rocks are extremely common at Cape Flora. This is a point of some interest, when considered in connection with Payer's remark that "amygdaloidal varieties, so common in Greenland, were never found in Franz-Josef Land."* The cavities have been filled with various substances, such as calcite, analcime, natrolite, chalcedony, quartz, and palagonite.†

* *New Lands Within the Arctic Circle*, German ed., p. 267.

† The following analysis represents the composition of the common type of basalt:

SiO ₂	47.28
TiO ₂	1.48
Al ₂ O ₃	13.24
Fe ₂ O ₃	4.44
FeO	10.50
MnO	.40
CaO	11.04
MgO	5.94
K ₂ O	.31
Na ₂ O	2.62
Loss on ignition	2.00
	<hr/> 99.25

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Under the microscope the constituents are seen to be plagioclase, augite, magnetite, olivine, interstitial matter, and various secondary products. The plagioclase occurs in forms giving lath-shaped sections, and also as aggregates of somewhat larger individuals, which mutually interfere with each other, and are more equally developed in the different directions. A broad type of albite lamellation is common to both modes of occurrence, and the individuals of the larger aggregates often show, in addition, a zonal structure and twining on the pericline plan. The lath-shaped sections in a common type of rock measure about .5 mm. in length by .1 mm. in breadth; whereas the individuals which compose the larger aggregates may measure as much as 1 or 2 mm. in their longest diameters. There is a certain amount of variation in the dimensions of the feldspars in different specimens, but the above figures will give an idea of the scale on which they are commonly developed in those varieties which contain comparatively little interstitial matter.

When the powder of the rock, freed from the fine dust by washing, is placed in a diffusion column of cadmium borotungstate, the feldspars form a fairly well-defined band, the centre of which corresponds to a specific gravity of 2.7. There is no great amount of scattering, and a fragment of labradorite floats in the centre of the band. The feldspar, therefore, agrees on the average with labradorite, but the optical characters of the zoned individuals, and the slight scattering of the grains in the diffusion column, indicate deviations on both sides of the average. The central portions of the zoned individuals are more basic than the marginal portions, but the transition is not always continuous; so that in the life-history of individual crystals there has occasionally been a recurrence of the conditions which gave rise to the deposition of more basic material. The larger individuals frequently contain inclusions of brown glass, with or without bubbles. These inclusions are as a rule limited to the central portions.

Augite is abundant in all the rocks, and forms, with feldspar, the greater portion of the mass in the majority of cases. Generally only one type of augite is present. In thin sections this is pale brown, more rarely yellowish-green, sometimes almost colorless. It is usually without any trace of crystalline form, and occurs as grains or patches, which are often penetrated by the lath-shaped sections of plagioclase. As a rule, several individuals having different orientations occur in juxtaposition, so that the ophitic structure, though present, is not so marked as it is in many of the holocrystalline dolerites from Iceland, the Faroe Islands, and the west of Scotland. It resembles in character and mode of occurrence the augite of the Tynemouth and related dikes in the north of England.*

One rock specimen, obtained from the underside of an iceberg found,

* "Petrological Notes on the North of England Dikes," *Quart. Journ. Geol. Soc.*, vol. xl., p. 209 (1884). See pl. xii., fig. 6.

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tilted up, off Eira Cottage, which otherwise belongs to the common type, contains more or less idiomorphic phenocrysts of pale greenish augite, with peripheral inclusions, in addition to the ordinary augite above described. A few grains of this mineral were isolated, and the presence of chromium established. It is, therefore, as was suspected from its appearance under the microscope, a chrome-diopside; and the fact is of some interest from the point of view of correlation, because Scharizer has proved the occurrence of this mineral under similar conditions in the basalts of Jan Mayen.* It will be shown subsequently that the basalts of Franz-Josef Land have other points of resemblance with those of Jan Mayen.

The iron-ore occurs as grains, crystalline aggregates, and skeleton crystals. It is strongly magnetic, and is often present in sufficient quantity to make the rock magnetic. The felspar and augite are as a rule remarkably free from inclusions of this mineral, which certainly does not in these rocks belong to the earlier phases of consolidation, as it does in so many rocks of intermediate composition. In many cases it is found only as skeleton crystals in the interstitial matter, and in some the iron-oxides have remained wholly undifferentiated in a deep brown glass.

Olivine is by no means constantly present, and rarely occurs in sufficient quantity to give a marked character to the rocks. It occurs as grains, and occasionally as more or less idiomorphic crystals. When fresh it is colorless in the thin sections; but it is sometimes represented only by green, or more rarely by brown alteration-products. The occurrence of olivine in sparsely scattered grains or crystals seems to be a special character of this class of basalts. Its absence from any particular section does not prove that it is entirely absent from the rock, for if several sections be prepared from one specimen it may be found in some and not in others.

In addition to the mineralogical constituents above described, the rocks invariably contain a certain amount of interstitial matter, which assumes different forms in different cases. It may occur as a brown glass comparatively free from microlites, as palagonite arising from the alteration of this brown glass, or as a fine-grained matted aggregate of microlites of augite, magnetite, and felspar, with which some colorless base may possibly be associated. Transitions from the condition of brown glass to the microlitic type may sometimes be observed, and under these circumstances the gradual bleaching of the glass by the separation of ferriferous constituents is clearly shown. The amount of interstitial matter varies considerably in different specimens. It is very small in amount in the massive varieties, but in some of the vesicular forms it becomes an important constituent.

The most interesting type of interstitial matter is the palagonitic. Palagonite is especially abundant in the amygdaloidal varieties, where it occurs

* "Ueber Mineralien u. Gesteine von Jan Mayen," *Jahrb. d. k.-k. geol. Reichsanst.*, vol. xxxiv., p. 707 (1884).

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not only wedged in between the crystalline constituents, but also as the infilling material of some of the amygdaloids. It is a soft black or greenish-black substance, which can be readily scratched with the finger-nail and cut with a knife. The powder has a soft, unctuous feel when rubbed between the fingers. Heated in a closed tube it gives off a large amount of water. It is readily acted upon by hydrochloric acid, and fragments leave behind a white siliceous pseudomorph. Under the microscope, in very thin sections, it is usually seen to be of a deep brown color; but occasionally it contains green zones arranged parallel with the boundaries of the space which it occupies. In its general appearance, and in the presence of this zonal structure, it resembles the palagonite from deep-sea deposits described by Messrs. Murray and Renard.* When viewed with crossed nicols the palagonite is seen to be doubly refracting. It appears to be formed of minute interlacing fibres or scales of a brown or, more rarely, of a green color. The double refraction of the deep brown palagonite enables us at once to distinguish it from the isotropic paler brown glass with which it is sometimes associated, and out of which it has been formed by hydration. The following analysis of this substance was made—analyses of palagonite and of the closely related "hullite" are quoted for comparison :

	I.	II.	III.	IV.	V.
SiO ₂	35.48	41.26	44.73	46.76	39.44
Al ₂ O ₃	8.30	8.60	16.26	17.71	10.35
Fe ₂ O ₃	12.30	25.32	14.57	1.73	20.72
FeO	14.60	—	—	10.92	3.70
MnO	—	—	2.89	0.44	trace
CaO	1.04	5.59	1.88	11.56	4.48
MgO	7.10	4.84	2.23	10.37	7.47
Na ₂ O	3.92	1.06	4.50	1.83	—
K ₂ O	trace	.54	4.02	0.17	—
H ₂ O, or loss on ignition	16.80	12.79	9.56	—	13.62
	99.54	100.00	100.64	101.49	99.78

- I. From amygdules in basalt at Cape Flora, Franz-Josef Land (Teall).
- II. Palagonite from Palagonia, Sicily. The insoluble residue (10.99%) is deducted, and the remainder calculated to 100. Quoted from Zirkel, *Lehrbuch der Petrographie*, 2d ed., vol. iii., p. 689 (1894).
- III. Palagonite from South Pacific. Analysis by Sipöcz, *Challenger "Report on Deep-Sea Deposits,"* p. 307.
- IV. Basic glass from the centre of the mass from which the palagonite (III.) was obtained.
- V. "Hullite" from Carnmoney Hill, near Belfast. Analysis by Hardman. Quoted from Sollas and McHenry, "On a Volcanic Neck of Tertiary Age in Co. Galway," *Trans. Roy. Irish Acad.*, vol. xxx., p. 734 (1896).

* "Report on Deep-Sea Deposits," *Chall. Exp.*, p. 304.

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The published analyses of palagonite differ considerably from each other, and the one which must now be added to the list does not entirely agree with any one of them. It is often stated that the iron present is wholly in the condition of ferric oxide. If this be taken as an essential character, the present substance is certainly not palagonite, for most of the iron is in the ferrous condition. The discovery of so large an amount of ferrous oxide was quite unexpected, and a second determination was made with special care. The results in both cases were identical. It may, therefore, be taken as certain that the present substance, which so closely resembles palagonite in its microscopic character, mode of occurrence, and relation to basic glass, is rich in ferrous oxide. As the other analyses differ widely in some respects, no great harm will be done by extending the use of the term so as to include this substance.

The "hullite" of Hardman has been shown by Professors Cole* and Sollas† to occur, like the palagonite of Cape Flora, as interstitial matter, and as the infilling of amygdaloids. Mr. Hardman's analysis shows that the two substances have decided chemical affinities. Both are remarkable on account of the large amount of iron. Under these circumstances it became important to compare them as regards specific gravity. Mr. Hardman gives the specific gravity of hullite as 1.76, and Professor Sollas confirms the somewhat extraordinary result. Five small pieces of palagonite were taken from two amygdules occurring in a specimen collected from the talus near Cape Flora, and placed in a solution of methylene iodide. After twenty-four hours immersion it was found that two sank, one remained suspended, and two floated in a liquid of specific gravity 2.433; four sank and one remained suspended when the specific gravity of the liquid was lowered to 2.409. The specific gravity is, therefore, not constant, but it is somewhat greater than 2.4.

On comparing the analysis of the Cape Flora palagonite with that of Palagonia, it will be noted that there is a close agreement so far as the total amount of iron is concerned, but an important difference as regards its state of oxidation. There are further important differences as regards the total amount of lime and the relative proportions of lime and magnesia.

The two analyses quoted from the *Challenger* report are especially interesting. One represents the palagonitic crust, and the other the nucleus out of which it has been formed. They indicate, as the authors point out, that the change is accompanied by hydration, elimination of lime and magnesia, oxidation of the ferrous iron, and addition of alkalis.

More interesting results will be obtained if, instead of considering the

* "On Hullite," *Rep. Belfast Nat. Field Club*, 1894-95, p. 1.

† "On a Volcanic Neck of Tertiary Age in Co. Galway," Sollas and McHenry, *Trans. Roy. Irish Acad.*, vol. xxx., p. 739 (1896).

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palagonite of Cape Flora in relation to more or less allied substances from other localities, we consider it in relation to the rock in which it occurs. This is a basalt with a specific gravity of about of 2.9. The palagonite has arisen from the hydration of the glass formed by the consolidation of the mother-liquor out of which the other constituents, mainly labradorite and augite, have crystallized. If we assume that the only chemical change which has taken place is that of hydration, then the percentage composition of the mother-liquor would be as follows:

SiO ₂	42.88
Al ₂ O ₃	10.03
Fe ₂ O ₃	14.86
FeO	17.65
CaO	1.26
MgO	8.58
Na ₂ O	4.74
	<hr/>
	100.00

In view of the researches of Lemberg* and the observations of Murray and Renard, the above assumption is not warranted. Alkalies may have been added, and lime and magnesia removed. There is, however, no reason to believe that the relative amounts of alumina and iron have been appreciably changed, and we are therefore able to draw the important conclusion that in a magma of the type to which these basalts belong—that is, a basic magma poor in alkalies—progressive crystallization leads to the formation of a mother-liquor poor in silica and alumina and rich in iron. It is possible that the relative amounts of lime and magnesia have not been seriously modified by the hydration, and, if so, we see that crystallization may, at any rate in its earlier stages, tend to increase the relative amount of magnesia. The partial separation of the lime, alumina, and silica from the iron and magnesia is, of course, effected by the crystallization of basic feldspars, which in this class of rocks precede the augites and sometimes even the olivine.†

This concentration of the iron, and to a certain extent magnesia, in the mother-liquor of basic magmas does not appear to have attracted the at-

* Lemberg examined the effect of water and solutions of alkaline carbonates on volcanic glasses. He says: "Fassen wir alles zusammen, so werden basische Gläser (Palagonitglas, Tachylyt) schon durch reines Wasser hydratisirt; durch Alkalicarbonat werden auch saure Gläser sehr rasch umgewandelt; dabei wird Wasser aufgenommen, Alkali gegen andere starke Basen ausgetauscht, Kieselsäure zum Theil ausgeschieden" (*Zur Kenntniss der Bildung und Umwandlung von Silicaten, Zeitschr. Deutsch. geol. Gesellsch.*, vol. xxxv., p. 557 (1883).

† See W. W. Watts, *Guide to the Collections of Rocks and Fossils in the Museum of Science and Art*, Dublin, 1895, p. 78.

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tention which it deserves. It shows that progressive crystallization in these magmas sometimes leads to a result the opposite of that observed in the case of intermediate magmas in which ferriferous compounds separate out during the early phases of consolidation.* The synthetic experiments of Messrs. Fouqué and Lévy† indicate that the formation of magnetite is not limited to one period in the history of the consolidation of silicate solutions, and the same fact has been established by Vogt in his work on slags. The last-mentioned author has made a special study of the conditions under which magnetite is formed, and has established the fact that in basic slags in some cases magnetite precedes olivine; in other cases it crystallizes simultaneously with olivine, and in yet others is formed after olivine.‡

If we take the analysis quoted above, minus the water and alkali, as representing the composition of the mother-liquor formed after the separation of labradorite and augite, it is clear that we have still the material necessary to form olivine, magnetite, and spinel (hercynite).

In view of the evidence thus furnished of the concentration of iron, one is tempted to speculate as to the results that might follow if the process were carried still further. Magnetite forms the matrix of the cumberlandites of Rhode Island and Taberg, in which olivine and felspar occur as phenocrysts.§ It is found as interstitial matter in the ultrabasic "schlieren" in the banded gabbros of Druim an Eidhne.|| Magnetite and a green spinel (hercynite?) are intimately associated in the pyroxenites from Scourie. Metallic iron associated with graphite occurs as interstitial matter in certain basalts in Greenland.¶

Can it be that in some, at least, of these cases we see the extreme results of the process indicated above?

We have now described the principal constituents of the common type of basalt. The different specimens vary somewhat as to the relative proportions of the several constituents, and still more striking differences are due to the presence or absence of amygdaloids. The massive varieties are of medium grain, and contain comparatively little palagonite or other form of interstitial matter; the amygdaloidal varieties are usually of somewhat

* "On some Quartz-felsites and Augite-granites from the Cheviot District," *Geol. Mag.*, 1885, p. 106.

† "Synthèse des Minéraux et des Roches," Paris, 1882.

‡ "Beiträge zur Kenntniss der Gesetze der Mineralbildung in Schmelzmassen," *Archiv. for Math. og Naturvidensk.*, Kristiania.

§ See "Lithological Studies," by M. E. Wadsworth, "Mem. Mus. Comp. Zool.," Harvard, vol. xi.

|| "On the Banded Structure of some Tertiary Gabbros in the Isle of Skye," Geikie and Teall, *Quart. Jour. Geol. Soc.*, vol. l., p. 645 (1894).

¶ "On the Existence of Nickel-iron . . . in the Basalt of North Greenland," K. J. V. Steenstrup, *Min. Mag.*, vol. vi., p. 1 (1886).

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finer grain, and contain a considerable amount of palagonite. The labradorite formed first, and the larger individuals sometimes contain glass inclusions in their central portions. The separation of labradorite probably left the mother-liquor poorer in alumina, lime, and soda, and this facilitated the formation of augite. The common augite occurs in irregular grains and patches, which are often penetrated by the felspars. The chrome-diopside belongs to an earlier phase of consolidation. Magnetite has formed at different stages, but it is commonly associated with the interstitial matter, and in many specimens the felspar and augite are almost entirely free from inclusions of this mineral. The bulk of the magnetite belongs to a comparatively late period in the history of consolidation. Its distribution in the rock is in accordance with the view that progressive crystallization has tended to concentrate the iron oxides in the mother-liquor. In some specimens there is no recognizable magnetite, the whole of the iron oxide, except that which occurs in the augite, remaining undifferentiated in the brown glass. Microscopic sections of the amygdaloidal varieties show the connection between the interstitial palagonite and that which partially or wholly fills the vesicular cavities. There is perfect continuity between the two kinds. In cases of partial infilling the central portion of the cavity is occupied by calcite.

Many specimens of more or less decomposed basalt from the talus at Cape Flora contain beautiful, radiating, fibrous aggregates of natrolite, and the same mineral occurs in a more compact form in concentric concretions, filling large, irregular cavities. It is found also in joints in rotten basalt. Analcime occurs in detached crystals, sometimes measuring more than 1 cm. in diameter, and also as aggregates of smaller crystals. The analcime of these rocks appears to be wholly of secondary origin, and does not occur as in the monchiquites and analcime basalts.*

Agates are also represented in the collection, and one large specimen of chalcedony and quartz which was evidently formed in a hollow cavity measures about $20 \times 12 \times 10$ cms.

Calcite is abundant in the altered varieties, and frequently forms the infilling material of the amygdules, occurring either alone or in association with palagonite.

The specimens of basalt on which the above description is based were mainly collected near Cape Flora. The collection includes a few from Hooker Island which belong to the same type, but which are all massive.

Two or three points still remain uncertain with reference to the basaltic formations of Franz-Josef Land. Judging from analogy with other districts of similar character, we should expect to find both lava-flows and intrusive sills. Tuffs and agglomerates are rare in regions of plateau-basalt.

*"On the Monchiquites or Analcite Group of Igneous Rocks," L. V. Pirsson. *Journ. Geol. Soc.*, vol. iv., p. 679 (1896).

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but they occasionally occur as necks and as beds interstratified between successive lava-flows. Then, again, old river-gravels and lake-deposits are sometimes found between the different outpourings of basalt.* Have we evidence of similar phenomena in Franz-Josef Land? Unfortunately there is no petrographical character by which sills can be in all cases distinguished from lavas in the Brito-Arctic province. The sills are usually coarser in grain, columnar, holo-crystalline, and ophitic in structure, but none of these characters can be relied upon as distinctive. Lavas are often amygdaloidal, but amygdaloids are not uncommon in sills and dikes.

We cannot, therefore, separate the specimens into two groups, lavas and intrusive sills. Nansen speaks of basalt interstratified with the underlying sediments, and the collection that we are describing contains specimens of amygdaloidal basalt "from lowest rock (six feet deep) having three feet layer of sandstone above it." They were collected from the water-course running down the talus. It is a well-known fact that the basalts of the west of Scotland are often intercalated between Jurassic strata,† and this fact led the early observers to conclude that they were of Jurassic age; but it is now universally admitted that this intercalation is the result of intrusion along planes of bedding, and that the basalts in question are post-cretaceous.

The existence of tuffs cannot be positively asserted from the evidence before us, but there are one or two specimens of highly altered rocks which may be tuffs. The evidence that pauses occurred during the formation of the plateau basalts is of a more satisfactory character. This is furnished by a specimen of a conglomeratic rock, mainly composed of basaltic débris and containing rounded pebbles, "found in dolerite some fifty feet above lowest rock," near Cape Flora.

We are indebted to Mr. Fisher for the following table, giving the lowest level at which the main mass of basalt could be seen at several localities; the base, however, was often hidden by talus:

Cape Flora	600 feet.
Cape Gertrude	700 feet.
Cape Stephen	650 feet.
'Tween Rocks	450 feet at one place, 200 feet at another.
Cape Grant	400 feet to 500 feet.
Cape Crowther	700 feet on one side, and sea-level on the other.
Cape Neale	500 feet.

* See Sir A. Geikie's paper on the "Tertiary Basalt Plateau of N.W. Europe," *Quart. Journ. Geol. Soc.*, vol. lii., p. 331 (1896). Future observers in Franz-Josef Land would do well to study this paper.

† Sir A. Geikie *op. cit.*, p. 375.

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IV. DISTRIBUTION OF BASALTS OF SIMILAR TYPE

We will now conclude this account of the ordinary basalts with some remarks on the general distribution of rocks of the same type. Specimens brought home by Payer were described by Professor Tschermak. He says: "It [the dolerite] is a medium grained, dark yellowish-green, crystalline, massive rock. Plagioclase forms the principal mass, although it only exceeds the augite by a small amount. The crystals of plagioclase are frequently 1 mm., sometimes 3 mm. long. They consist sometimes of thin, and sometimes of thick, lamellæ. The augite is greenish-gray, shows no crystalline outlines, but forms grains which are often 1 mm. in diameter. Inclusions of the other minerals are frequent, and also gas-pores. Olivine forms grains which are smaller than the augite, and only seldom show crystalline faces. These grains are frequently surrounded with a border of a yellowish-brown mineral (eisenchlorit). The titaniferous iron-ore occurs in long plates or fills the space between the other minerals." The resemblance of this rock to the dolerites of Spitzbergen is pointed out, and it is also stated that "amygdaloidal varieties, so common in Greenland, were never found in Franz-Josef Land; while the rocks in the south were aphanitic, and thus like true basalts, those in the north were coarse-grained and nepheline-bearing.* From this description we may conclude that the rocks brought home by Payer from the eastern portion of the archipelago resemble the massive olivine-bearing varieties of the Jackson-Harmsworth collection. Professor Tschermak makes no mention of the occurrence of palagonitic material as interstitial matter, but he refers to an iron-chlorite which he regards as arising from the alteration of olivine. It is possible that this substance may in part represent the palagonite so common in the rocks from Cape Flora. He speaks of the "titaniferous iron-ore" as "sometimes filling the space between the other minerals." The magnetite in the specimen that we examined contained only traces of titanitic acid, and in none of our rocks does it actually occur as interstitial matter. It either crystallizes out during the later stages or else remains undifferentiated in the residual glass. Specimens from the northern part of the archipelago have not as yet been examined in detail, but both Payer and Nansen agree that more coarsely crystalline varieties occur in this region. It would be interesting to know the exact nature of the evidence on which nepheline has been stated to occur.

The more or less allied rocks of Spitzbergen have been described by A. E. Nordenskjöld† as hyperite, and by Drasche‡ as diabase. They fre-

* *New Lands Within the Arctic Circle*, German ed., p. 267.

† *Sketch of the Geology of Spitzbergen*, Stockholm, 1867.

‡ *Petrographisch-geologische Beobachtungen an der Westküste Spitzbergens*, Tscherm. Min. Mitth., 1874, p. 261.

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quently occur as sills in rocks of very variable age. Both authors appear to regard them as contemporaneous with the strata in which they are found, and Drasche comments on the remarkable nature of the fact that rocks so uniform in character should be associated with strata of all ages from pre-carboniferous to tertiary. The remarkable nature of this fact disappears if we regard the rocks as intrusive sills.

A curious difference of opinion has arisen between Bäckström* and Nathorst† as to these Spitzbergen rocks. At the conclusion of his paper on the liparites of Iceland, Bäckström calls attention to the widespread distribution of the basalts in the Arctic province which "extends on the one side to Spitzbergen and Franz-Josef Land, on the other to Greenland, and in the south to Scotland." Nathorst, in commenting upon this statement, points out that basalt has not been found in Spitzbergen, but that post-triassic diabases occur both as dikes and sheets (Decken). Whether the Spitzbergen rocks should be termed basalts or diabases is a matter of comparatively slight importance; it is certain, however, from Drasche's description that some of them are substantially identical with rocks described as basalt from other portions of the Brito-Arctic province. It is often not clearly recognized by continental authors that the basalts and dolerites of this province are more closely allied in composition and structure to the pre-tertiary diabases of the continent than they are to the tertiary basalts of the same region. We may safely conclude that the so-called "diabases" of Spitzbergen described by Drasche are of the same general character, and approximately of the same age, as the basalts of Franz-Josef Land.

The rocks of Jan Mayen have been described by Reusch‡ and Scharizer.§ The descriptions of these authors show that rocks closely allied to those of Franz-Josef Land occur on this island. Thus Reusch speaks of the occurrence in one of the specimens examined by him of hollow cavities "encompassed by a zone of glass," and Scharizer records the presence of a chrome-diopside. In the British Isles the rocks which most closely resemble the vesicular basalts of Cape Flora are those of Carnmoney Hill, near Belfast, and of Bunowen Tower, in Co. Galway.|| Both these rocks are ophitic dolerites which contain brown glass or its hydrated alteration product (hullite). The rocks of the Tynemouth and related dikes also resemble the basalts of Franz-Josef Land, but the interstitial matter which also occurs in some of the amygdules is always devitrified.

* *Beiträge zur Kenntniss der islandischen Liparite*, Geol. Foren, Stockholm Forhandl., vol. xiii., p. 671 (1898).

† *Einiges über die Basalte des arktischen Gebietes*, *ibid.*, vol. xiv., p. 60 (1892).

‡ *Det Norske Nordhavs-Expedition*, 1876-1878, Christiania, 1882, p. 27.

§ Ueber Mineralien u. Gesteine von Jan Mayen, *Jahrb. d. k.-k. geol. Reichsanst.*, vol. xxxiv., p. 707 (1884).

| See papers, already quoted, by Professors Cole and Sollas.

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It is evident, therefore, that the basalts of Cape Flora and Hooker Island are similar types widely distributed in the Brito-Arctic volcanic province. They differ from the more common holocrystalline ophitic dolerites in containing a small quantity of interstitial matter. The general result of this examination is to confirm the conclusions of Payer, Etheridge, and others that Franz-Josef Land belongs geologically to an extensive region of plateau-basalts, including such widely separated localities as Jan Mayen, Iceland, Greenland, the Faroe Islands, the west of Scotland, and the north of Ireland.

The second type of basalt is represented by some small angular fragments obtained from the underside of an iceberg in De Bruyne Sound. It differs from the common type above described, both in macroscopic and microscopic characters, and is, therefore, considered by itself. The rock is dark gray in color, compact, and of so fine a grain that extremely thin sections and high powers are required to reveal its true character. The specific gravity is 2.977. The principal constituents are granules and microlites of augite (.008 mm. and $.008 \times .04$ mm.), microlites of feldspar ($.004 \times .04$), and crystals or grains of magnetite ($.008 \times .02$).^{*} It is possible that a small quantity of colorless interstitial matter (analcime?) may be present. The rock contains a few scattered feldspars, somewhat larger than the microlites, and also grains of quartz and patches of calcite. A special feature is the occurrence of aureoles of slender augite-microlites round some of the patches of quartz and calcite. These microlites are larger than those of the main mass of the rock, and show a rough tendency to a radial arrangement with reference to the nucleus.

The occurrence in basaltic rocks of quartz-grains surrounded by aureoles rich in augite-microlites has been frequently described,[†] and a discussion has arisen as to whether the quartz is indigenous or exotic. In this case the aureoles surrounding quartz are precisely similar to those surrounding calcite.

The microscopic action also shows many groupings of augite-microlites similar to those surrounding the grains of quartz and calcite, but without a central nucleus. This may be, and doubtless is in some cases, due to the fact that the section does not pass through the centre, but the occurrences appear to be too frequent to be entirely explained in this way. This type of basalt appears to be rare in the volcanic province to which Franz-Josef Land belongs. We are unable to refer to any rocks from this province with which it can be said to be closely allied.

^{*} The figures are merely intended to give an idea on the scales on which the different constituents are developed.

[†] "On a Group of Volcanic Rocks from the Tewan Mountains, New Mexico, and on the Occurrence of Primary Quartz in Certain Basalts." J. P. Iddings, *Bull. U. S. Geol. Surv.*, No. 66, 1890.

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V. FOSSILS AND SEDIMENTARY ROCKS OF FRANZ-JOSEF LAND

The greater number of the fossils have been collected in the immediate neighborhood of Elmwood, the depot of the Jackson-Harmsworth party, and around Cape Flora; but others have been obtained farther afield during some of the longer expeditions. Each of the localities, with the fossils there found, will be first noticed, and their relations to each other afterwards considered.

The little settlement of Elmwood is on the south side of Cape Flora, on the island of Northbrook. It is placed on a raised beach at an elevation of about forty to fifty feet above the sea. Behind the settlement are extensive talus-heaps, above which steep cliffs rise to a height of about 1100 feet above the sea, and this is capped by 100 feet or more of ice. The lower 500 or 600 feet appears to be chiefly clay, interstratified with shales and bands of iron-stone, lignite, etc., and almost hidden by the talus, while the upper 500 feet is basalt.

I. NORTH OF CAPE FLORA

The highest fossiliferous bed said to be *in situ*, of which the collection has representatives, is that discovered by Dr. Koettlitz on the north side of Cape Flora, where a bed of shale, broken into innumerable fragments and containing impressions of plants, was found lying across a mass of dolerite, protruding through the west side of a glacier at a height of about 700 feet above the sea. This plant-bed, therefore, would seem to be included in the thickness of the basalt. A number of specimens were collected at this point by Dr. Koettlitz and subsequently by Dr. Nansen. The last-named gentleman submitted his collection to Dr. Nathorst, the well-known Scandinavian authority on fossil plants, and a very interesting account of them is given in Dr. Nansen's *Farthest North*,* together with some woodcuts of certain of the specimens. According to Dr. Nathorst, the most abundant remains were needles and seeds of coniferous plants, which he refers to *Pinus* and *Taxites*; but the most interesting among his specimens are leaves of the genus *Gingko*, only one species of which is now living—in Japan. This genus, however, is very characteristic of certain oolitic deposits in Europe, and several species have been found in the Jurassic, cretaceous, and tertiary strata of Spitzbergen, Greenland, and eastern Siberia. One of the forms from Franz-Josef Land is believed by Dr. Nathorst to be a new species, for which he proposes the name of *Gingko polaris*. It is said to be a near ally of *G. flabellata* from the Jurassic of Siberia, and is not unlike the *G. digitata* from British oolitic strata.

A few ferns were included in Dr. Nansen's collection, and these are said

* Vol. ii., p. 484.

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to represent four types, but to be too imperfect for specific determination. One of these is referred to the genus *Cladophlebis*; two others are said to suggest the genera *Thyrsopteris* and *Onychiopsis*, while the fourth seems closely allied to *Asplenium petruschinense*, described by Heer from Jurassic strata in Siberia.

PLANTS IDENTIFIED BY DR. NATHORST

Pinus like *Nordenskioldi*, but probably another species. *Pinus* species with narrow needles. *Pinus* seeds, resembling those of *Maakiana*. *Taxites* nearest to *T. gramineus*, Heer. *Feildenia* (= *Torellia*) sp. *Gingko polaris*, Nath. *Gingko* sp. *Czekanowskia*. *Cladophlebis*. *Thyrsopteris*? *Onychiopsis*? *Asplenium*, near to *A. petruschinense*.

A goodly number of examples of these plant-impressions collected by Dr. Koettlitz have been sent home, and although small and fragmentary, as indeed were all the specimens found at this locality, they represent most of the forms mentioned by Dr. Nathorst. There are many of the winged seeds of *Pinus*, varying in form, and possibly representing more than one of the species alluded to in the above list. With these are numerous pine-needles, both broad and narrow, as well as a portion of a branch and a small cone. A few fragments may belong to the genus *Feildenia* [*Torellia*]. The peculiar form *Gingko* is represented by many specimens, some of which are referred to Dr. Nathorst's new species, *G. polaris*; but there are others rather larger, with more slender divisions to the leaves, and with seven or eight ribs on each blade, which are very like *G. siberica*, Heer, if they are not identical with that species.

Ferns are represented by several specimens which, although small, are well preserved, and in some the venation of the pinnules is particularly well shown. There is some variation in the form of the pinnules of these specimens, but this is not greater than might be expected in different individual plants, or perhaps even in parts of the same frond. The only genus mentioned by Dr. Nathorst to which these could belong is *Thyrsopteris*, and there is much resemblance between the present specimens and *Th. Murrayana* and *Th. Maakiana*,* which occur in the Jurassic rocks of eastern Siberia and of England.

The pinnules of these ferns also bear much resemblance to the figures of *Adiantites amurensis* as given by Heer,† but it seems best, for the present, to leave them in the genus *Thyrsopteris*. In none of these forms, however, is the venation so clearly shown as it is in some of the Franz-Josef Land specimens, and in the latter also the bifurcation of the veins in the pinnules seems to be more regular and definite.

* Heer, *Flora Fossilis, Arctica* vol. iv., *Beiträge zur Juraflora Ost-Sibiriens*, etc., pl. i.

† Ibid., pl. xxi., fig. 6.

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Dr. Nathorst found no cycads among his specimens; there are, however, in our series one or two long lanceolate leaves, not quite perfect, which so closely resemble some of those that have been called *Podoxamites lanceolatus* that they are provisionally referred to that species.

We have a few examples of long, slender, regularly tapering leaves(?), with few strongly marked longitudinal ridges; these are broken across in such a way as to resemble a jointed stem, and remind one of a slender *Equisetum*. The true affinities of these specimens are not clear, but they bear some resemblance to *Baiera* and *Czekanowskia*.

With regard to the probable geological age of these plants, we could not do better than quote the opinion of Dr. Nathorst; but, as we are not permitted to do so, we can only refer our readers to *Farthest North* (p. 487), and say that on the whole this flora resembles that of the Upper Jurassic beds of Spitzbergen, and indicates a cool climate, but one much more genial than that which obtains in Franz-Josef Land at the present day.*

2. EAST OF ELMWOOD

The second set of specimens to be noticed are labelled "East Elmwood and above Sharpe's Rock." These are specimens of some thin beds of shale which were found exposed *in situ* just below the basalt, but in which no fossils were found. Taken in descending order, these are:

- (i) Black shale 4 inches thick, from just below the basalt. There is no appearance of this shale having been heated to any extent by contact with the basalt.
- (ii) Black material like the preceding, but broken into fine particles and powder, $1\frac{1}{2}$ inch thick.
- (iii) Greenish-gray shale, 3 inches thick.
- (iv) A lighter colored, brownish clay-shale, the thickness of which is not recorded.

Near this same spot, at the base of the second tier of basalt, a part of a tree-trunk was found embedded in the rock; it measures 2 feet long, and is about 40 inches in circumference. The wood is partly silicified, but some portions appear to be preserved in carbonates of lime and iron.

3. ELMWOOD

In a watercourse at the back of Elmwood the rock is uncovered at a point 50 feet below the basalt, and from this exposure of "clay sandstone" a small, well-preserved ammonite was obtained.

Unfortunately this ammonite is the only specimen which was found in place at this spot, but in the same watercourse below the exposure of rock,

* This plant-bed was subsequently found at other places around Cape Flora. See *Quart. Journ. Geol. Soc.*, vol. liv., p. 648 (1898).

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and apparently fallen from the rocks above, a number of other specimens were collected, chiefly in blocks of clay iron-stone. Among these are ammonites identical with that found in place, as well as others which are referable to *A. macrocephalus* and *A. modiolaris*.

The number of species found at this locality is not great, and they will now be considered in detail.

AMMONITES (CADOCERAS) TCHEFKINI (?), d'Orb.—To this species is referred provisionally the one ammonite found *in situ* 50 feet below the basalt at Elmwood, as well as several other specimens found in the water-course below this exposure and two others from the side of the glacier at the western end of Cape Flora.

The ammonite found *in situ* is about 22 mm. in diameter, and 7 mm. thick; the umbilicus is 6 mm. in diameter. The ribs are sharply defined and regular in thickness, having no enlargements or tubercles; they pass outward from the umbilicus, and in most cases bifurcate about the middle of the side, then with a definite flexure forward pass over the back, which is narrow but not sharp. Most of the other specimens above noted agree so closely with the one just described as to need no further mention, but one of them is nearly twice the size (35 mm.), and shows that the forward flexure of the ribs becomes less marked as the shell grows larger. The outer part of this specimen is crushed, so that its form is uncertain.

On comparing these ammonites with young examples of *A. Tchefkini* from Russia their agreement is found to be so close that, for the present, they are referred to that species; but at the same time there are small points of difference which leave some doubt. None of the Franz-Josef Land specimens are large enough to show signs of the lateral expansion which characterizes the adult *A. Tchefkini*, but the largest of them retains the same character of the ribs on the outer whorls that it has on the inner whorls—that is to say, the ribs merely bifurcate, and consequently those around the umbilicus are of the same size as those near the back. Now, in all the larger specimens of *A. Tchefkini* available for comparison, the ribs around the umbilicus are distinctly larger than those on the back, and only one-third or perhaps one-fourth as numerous. The figures of *A. Tchefkini* given by De Verneuil* and Nikitin† show this same character.

In the Museum of Practical Geology there are several specimens from the Kellaways Rock of Chippenham which come very near to the Arctic ammonites, and these have been regarded as a variety of *A. Mariae*.

AMMONITES (CADOCERAS) MODIOLARIS, Luid. — The specimens from this locality referred to the above species are two fragments of whorls which show the lobes and saddles very clearly, and in form and markings agree closely with examples of *A. modiolaris* from the Kellaways Rock. A

* *Géologie de la Russie d'Europe*, vol. ii., pl. xxxv. (1845).

† *Mém. Acad. Imp. Sci.*, St. Petersburg, ser. 7, vol. xxviii., No. 5, pl. iii. (1881).

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cast from the umbilicus of one of these fossils also agrees with this species, and there is a similar cast from the talus of the western end of Cape Flora which just fits the umbilicus of one of the Kellaways Rock specimens in the Museum of Practical Geology.

One specimen from the talus near Elmwood embedded in iron-stone and partly crushed, so as to give the appearance of a sharp back, has a much wider umbilicus than is usual in *A. modiolaris*; but as this agrees with the figures given by Professor S. Nikitin of a specimen from Elatma,* which is regarded as *A. modiolaris*, the Cape Flora specimen is likewise referred to this species.

Another specimen, from below where the rock was found *in situ*, is more compressed, and in this respect somewhat resembles *A. Elatma*,† but, while the ribs are quite as strong as in the latter species, there is no evidence of the large tubercles around the umbilicus.

A better preserved example of this variety was obtained from the side of the glacier at the west point of Cape Flora.

AMMONITES (MACROCEPHALITES) MACROCEPHALUS, Schloth. — The specimens from the present locality referred to this species are not good, but a much better example is that received in the earlier consignment and noted by Mr. G. Sharman in the *Geographical Journal*.‡ a further examination of which has convinced us that it is true *A. macrocephalus*. In these specimens the ribs pass directly outward from the small umbilicus, and, after bifurcating, run over the back without any forward flexure; they agree with British and Continental examples of this species, and attention may be especially directed to Professor Nikitin's§ figures of specimens from Kellaways beds near Elatma, in central Russia.

Another specimen found upon the talus heap, which includes about half the shell, has rather more rounded whorls; but, as it resembles some of the inflated forms which have been referred to *A. macrocephalus*, it is provisionally allowed to remain here.

BELEMNITES PANDERI, d'Orb. — Fragments of several belemnites have been collected at No. 3 locality, but only a few of them can be determined with certainty; on comparing them, however, with better fragments from the talus, there is no doubt as to their being the same species. These belemnites belong to the group in which the radiation, seen on the cross-section of the guard, is eccentric, as in the well-known *B. lateralis*. In the specimen now under consideration the guard is not flattened dorso-ventrally, as in the last-named species, but to a slight extent laterally, and there is a distinct, though not very deep, ventral groove near the apex, and ex-

* *Nouv. Mém. Soc. Imp. Nat.*, Moscou, vol. xv., pl. xi., fig. 48 (1885).

† Nikitin, *op cit.*, vol. xiv., pl. xi., fig. 21 (1881).

‡ Vol. vi., p. 518 (1895).

§ *Nouv. Mém. Soc. Imp. Nat.*, Moscou, vol. xv., pl. viii., fig. 44 (1885).

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tending a short distance along the guard. The most perfect specimen was found on the talus at the western end of Cape Flora: it is only about two inches long, and shows nothing of the alveolar cavity. Other examples retaining this cavity show that it is eccentric.

A comparison of these belemnites with a series from Russia, in the possession of Mr. Lamplugh and named by Professor Alexis Pavlow, left no doubt as to their agreement with examples of *B. Panderi*, a species which has been recorded from the Middle Kellaways and passes upward to the Kimeridge Clay.*

PECTEN *cf.* DEMISSUS.—The mould of a small *Pecten* evidently indicates a shell closely allied to, if not identical with, the common oolitic *Pecten demissus*, which is one of the species recognized in the Upper Jurassic rocks of Spitzbergen.

GORGONIA (?).—On one of the iron-stone blocks is to be seen a long cylindrical body, about 1 mm. in diameter and 70 mm. long, the nature of which is by no means clear. Only part of this now remains, and it seems to be entirely replaced by iron pyrites. Externally it is almost smooth, with a few transverse, very fine lines. This fossil calls to mind the rod of the living *Pennatula* and that of the *Graphularia* from the London Clay: but it is not now a continuous rod: there are regular intervals here and there, reminding one of the interrupted condition of the stem in the genus *Isis* and its allies. These intervals may, however, be due to breakage before being embedded in the rock.

PHOSPHATIC NODULES.—Rounded and ovoid nodules of a pale brown color externally, but black or dark brown internally, occur with these fossils, and apparently at almost all the horizons from which fossils have been collected; mostly they seem to have been free in the clay, but sometimes they are included in the clay iron-stone. These nodules vary much in size, some being less than an inch in diameter, others three or four inches in length and perhaps two inches in diameter. Thin sections under the microscope show, for the most part, a mass of fine débris, with nothing definable; but some specimens show in parts small masses of minute oval bodies, with a long diameter of 1 mm., which agree in form and size with the small coprolites described by Mr. A. Strahan† from the phosphatic chalk of Taplow, and indeed there can be little doubt that they are the droppings of some small animals. And, further, upon closer examination with the microscope these minute ovoid bodies may be seen pressed closer and closer together until at last they form one mass; but in most cases the separate pellets may be still distinguished. A number of these nodules have been tested, and in all cases they proved to be rich in tricalcic phosphate.

* S. Nikitin, *Ueber die Beziehungen zwischen der russischen u. der westeuropäischen Juraformation*, Neues Jahrb., vol. ii., p. 205 (1886).

† *Quart. Journ. Geol. Soc.*, vol. xlvii., p. 356 (1891).

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The following forms have been identified from this horizon at locality No. 3:

Ammonites (Macrocephalites) macrocephalus. *Ammonites (Cadoceras) Tchekini?*
Ammonites (Cadoceras) modiolaris. *Ammonites (Cadoceras) modiolaris*, var. *Belemnites Panderi*. *Pecten cf. demissus*. *Gorgonia?* Phosphatic nodule.

Precisely similar forms have been found in the talus at other points near Elmwood, and on the side of a glacier-slope at the western point of Cape Flora.

This series of fossils, although small, is of the greatest interest, inasmuch as it contains ammonites which give no uncertain indication of the horizon to which they must be referred. *Ammonites modiolaris* is distinctly a Kellaways Rock form, although extending into the true Oxford Clay. The occurrence with this of *A. macrocephalus*, which not only occurs in the lowest Oxford Clay and Kellaways Rock, but is perhaps the most characteristic ammonite of the Cornbrash, shows very clearly that beds of lowest Oxfordian age occur at Cape Flora at a height of about 400 or 500 feet above the sea, and doubtless correspond to some extent with the "*macrocephalus*-beds" which are now known to have so vast an extent throughout the northern hemisphere, if, indeed, they do not also occur in Australia.

4. WINDY GULLY

The next exposure of rock to be noticed is that which was found at the southern end of Windy Gully, a valley northeast of Elmwood, running nearly north and south. Near the southern end of this valley there is a projecting shoulder of rock, and on this, at a height above the sea of about 300 feet,* a number of fossils were obtained, nearly all of them being in hard concretions or in phosphatic nodules. Dr. Koettlitz is satisfied that they were *in situ*; but even if not actually in place, they could only have been weathered out of the rock on which they rested.

These beds seem to be lower in the series than those of No. 3, unless the strata are less horizontal than we understand them to be, and they have yielded a different set of fossils; the most striking of these are some ammonites which are believed to be varieties of *A. Ishmæ*, a species described by Keyserling from Ishma in Petchora Land.

AMMONITES (MACROCEPHALITES) ISHMÆ, Keys., var. ARCTICUS.—Several examples of this ammonite were found, but they vary somewhat in form. The most typical specimen is also the most perfect; it is about 2½ inches in diameter, and its greatest thickness measures 1¼ inch. The ribs, which are sharply defined, pass outward, with a distinct inclination forward. At a distance from the umbilicus of about one-third the height of the whorl, the ribs bifurcate and then pass over the back. Occasionally there is a

* [Dr. Koettlitz says "over 400 feet."]

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single rib interposed. The umbilicus is very small, less indeed than is usually the case in *A. macrocephalus*, although it is equally small in some specimens that have been referred to the latter species. In nearly all the above points our specimen resembles *A. macrocephalus*, but on closer examination it is found that the whorls do not increase so rapidly; and as at the same time they are more involute, the outer whorls are much more encroached upon by the whorl which precedes it; so that while in *A. macrocephalus* the last whorl is encroached upon for less than half its height, in the present form the encroachment is always more than half the height, thus indicating a different mode of growth. And further, the sides of this species are less inflated around the umbilicus, and more so towards the back; so that the entire shell has a different aspect.

If this specimen be compared with Keyserling's figure of *A. Ishmae* from Petchora Land,* it will be seen that in most of those points in which our specimen differs from *A. macrocephalus* it approaches *A. Ishmae*; but at the same time the inner whorl of *Ishmae* does not encroach so much upon the outer one as is the case in the Arctic specimen. This encroachment of the whorls, involving, as it does, a different growth of the shell, may perhaps be thought sufficient for the establishment of a new species, and if so the name of *A. arcticus* may be used; but it has seemed better for the present to include this form in the species *A. Ishmae*, and call it a variety—*arcticus*.

Among the ammonites collected from this locality there are two others which agree with the one described, but are less perfect; besides these are two which, agreeing with the type in all main particulars, differ in being more inflated, and one of them has coarser ribs. Still another specimen, showing all the characters of the type, has the outer whorl nearly smooth, although it is a rather smaller shell. The specimen above described, however, shows the beginning of this smooth outer whorl, but it must have been a considerably larger individual.

BELEMNITES sp.—A number of portions of belemnites were found at this locality, but none of them are perfect enough for specific determination. Two of these are phragmocones of some large species, contained in nodules. Another specimen gives evidence of a long slender form, apparently circular in section and concentrically radiated. This belemnite is preserved in a block of iron-stone, and possibly belongs to another bed.

The remainder of the specimens are much decomposed; some of them seem to have been compressed laterally, and to show a deep ventral groove. One specimen is a short form, with the alveolar cavity seemingly reaching to near the apex.

Although it is tolerably clear that these *Belemnites* represent at least

* *Reise in das Petschora Land*, p. 331, pl. xx., figs. 8 and 9 (1846).

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three species, yet there is no evidence of an eccentric form which could be referred to *B. Panderi*.

Phosphatic nodules occur.

LIST OF FOSSILS FROM WINDY GULLY

Ammonites (Macrocephalites) Ishmæ, var. *arcticus*. *Ammonites (Macrocephalites) Ishmæ*, inflated variety. *Ammonites (Macrocephalites) Ishmæ*, smooth variety. *Inoceramus*, large form resembling *I. Cuvieri*. *Belemnites*, three species. Phosphatic nodules.

Although it is clear, from their relative height above the sea, that these fossils occupy a lower horizon than the bed with *A. macrocephalus* and *A. modiolaris*, yet the fossils themselves give no evidence that such is the case; and it is quite possible that they may belong to the lower Oxfordian. It seems likely, however, that being 150, or perhaps 250 feet, lower in the series of beds, and the fossils of a different type, they represent a somewhat lower horizon and may perhaps be more nearly of the age of the Cornbrash.

5. WEST OF ELMWOOD

At a spot about five hundred yards west of Elmwood, and some thirty or forty feet above the sea, "sandy shale" was found *in situ*, and from this were collected a number of fragmentary fossils which had been washed out from the rock. These fossils are mostly either pieces of belemnites or parts of a large species of *Avicula*, but there is one fragment of an ammonite allied to *A. Gowerianus*, which is as yet undetermined.

BELEMNITES sp.—Most of the fragments of belemnites from this locality are so much broken and decomposed that it is hopeless to think of specific determination; nevertheless, there are a few points which may be noticed. There are evidently two, if not three, forms; but none of them can be referred to *B. Panderi*, as they do not show the marked eccentric radiation of the transverse section, characteristic of that species. One form is compressed, with a well-marked groove near the apex and a slightly eccentric radiation.

A second form is similar, but much more compressed, and there seems to have been a deep groove extending from the apex some distance up the guard.

The third form is cylindrical, concentrically radiated, and with a comparatively acute apex.

Some of these belemnites may be the same as those from locality 4.

AVICULA sp, cf. *INÆQUIVALVIS*.—There are several of these large *aviculas*, but all are more or less crushed and broken. Some of them, probably on account of breakage, look more equilateral than others, and

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at first sight remind one of *Pecten*; but the large wing on one side shows that they do not belong to that genus.

The best preserved specimen in its present condition is $1\frac{1}{2}$ inch in length; but, with the exception of the umbo and a piece of the hinge, all the margins are broken away, and, judging from other fragments, the species must have reached three or four inches in diameter. One valve is moderately convex, while the opposite valve is concave. Strong ribs radiate from the umbo to the margin; between these are finer ribs, and a third still smaller series are to be seen between each of these, giving the shell much the appearance of a well-marked *A. inæquivalvis*, but in that species the ribs are not nearly so strong. The concave valve is less distinctly marked than the other. The hinge is long, and the posterior wing is much larger than the anterior. Some of the specimens appear to be more equilateral than others, but this is believed to be due to crushing; and as all have similar markings, they are regarded as one species.

The small height above the sea at which this exposure of rock is situated, to the west of Elmwood, shows that it occupies a position at about 250 feet below the bed with *Ammonites Ishma*, var. *arcticus*, at Windy Gully, but the specimens give no idea of their age.

6. CAPE GERTRUDE

Cape Gertrude, which is some two or three miles east of Cape Flora, rises to a height of about 1100 feet above the sea. Mr. Fisher, who has carefully examined this locality, says that the uppermost 100 feet is basalt, columnar above, but more irregular underneath. From the base of this basalt to the sea-level the face of the cliff is almost hidden by talus; but at one place the débris has been cleared away, apparently by ice or rock falling from above, exposing a series of sedimentary beds more than 200 feet high by about 100 feet wide, the lowest part being between 300 and 400 feet above the sea. Dr. Koettlitz, with Mr. Fisher, measured the section thus exposed, and they found as many as seventy beds of sand, flaggy sandstone, pebbly sand, shales, lignite, etc., varying in thickness from 3 inches to 25 feet. The extraordinary number of thin beds of diverse character shown in this section points to rapidly varying conditions of deposition, and possibly to oscillations of level; while the beds of lignite indicate, to some extent at least, a fresh-water origin.

With the exception of this lignite, and some wood found embedded in the lower part of the basalt, no fossils have been obtained from this section, and consequently the beds cannot be correlated with those at Cape Flora. The lignite-seams at the latter locality, and the few indications there seen of the nature of the beds, appear to indicate many rapid alternations of thin beds, similar to these at Cape Gertrude; and, judging from this and the height of the beds above the sea, it is likely that the Cape

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Gertrude section corresponds to part of the Jurassic series present at Cape Flora.

Much interest attaches to the discovery above mentioned of the masses of wood in the lower part of the basalt; for Mr. Fisher says that it is of precisely the same character as the silicified wood which has been found so abundantly on the talus at Cape Flora and also at Cape Gertrude; but this is the one place where it has been found *in situ*, and is the only clue that we at present possess as to its place of origin.

7. CAPE STEPHEN

We have now to travel some twenty miles west of Cape Flora to Cape Stephen. Both at this point, and also between here and Cape Grant, a hard calcareous sandstone was met with, near the sea-level and under the raised beach. This bed, which is *in situ*, contains an abundance of carbonized plant-remains, but they are not well preserved, and in none of them can the details of structure be seen. Consequently their determination cannot be settled with that degree of certainty which could be wished. Although the stems of Equisetaceæ and some other forms are not unlike species with which we are familiar in the Yorkshire Lower Oolites, yet these Arctic specimens seem to agree best with the flora described by Professor Schmalhausen from Petchora and Tunguska.*

PHYLLOTHECA (EQUISETITES) *cf.* COLUMNARIS, Phil.—Several striated and jointed stems, such as we have long known under the name of *Equisetum columnare* in the Yorkshire beds, occur in these sandy deposits at Cape Stephen. These stems vary from $\frac{1}{4}$ to perhaps $1\frac{1}{4}$ inch in diameter. In two instances, what looks like an outer sheath of a joint is preserved, showing at one end the oval spaces to which the whorl of spikelets, or perhaps branches, was attached. There is also one portion of a "disk" with the spikelets still attached.

RHIPTOZAMITES(?) *cf.* GÖPPERTI, Schmalh.—The cycadaceous leaves of various shapes and sizes from northern Siberia which are referred by Professor Schmalhausen to the above genus and species seem to find their counterparts among the plant-remains on these slabs from Cape Stephen. Some of these leaves are slender and lanceolate, others broader and more oval, but each leaf, as far as can be seen, has fine ribs running nearly parallel from end to end. A portion of what may be a large oval woody leaf of this form, in its present broken condition, measures nearly 2 inches in width.

ANOMOZAMITES(?)—A fragment of what appears to have been a large leaf of a Cycad allied to *Anomozamites* shows what seems to be a broad midrib, and on one side three unequally divided portions of the leaf, thus

* *Mém. Acad. Imp. Sci.*, St. Petersb., ser. 7, vol. xxvii., No. 4, (1880).

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resembling the genus *Anomozamites*; it is introduced here for the sake of calling attention to the possible presence of this genus, but the specimen is not sufficient for certain identification.

ZAMIOPTERIS (?) cf. GLOSSOPTEROIDES, Schmalh.—There are a number of more or less fragmentary leaves to be seen on these slabs which, while varying in size, agree in being broadly lanceolate and in having a venation which passes obliquely outward from the middle line forward to the periphery, but without a definite midrib. The venation of these leaves certainly appears coarser than those shown in the figures given by Schmalhausen, but as it is possible that this may be due to their bad state of preservation, I have provisionally referred them to *Zamiopteris*.*

ASPLENium cf. WHITBIENSE, Brongn.—A portion of the frond of a fern with pinnulæ short and pointed, with entire margins and with a base attached by its whole width, is generally believed to represent the species, which, besides its original home, the Yorkshire Oolites, is said to occur in the north of Siberia. The venation of the Franz-Josef Land specimen is entirely obliterated, and consequently the determination can be regarded as only doubtfully correct.

LIST OF FOSSILS FROM CAPE STEPHEN

Phyllothea cf. *columnaris*, Phil. *Rhizozamites* (?) cf. *Gæpperti*. *Anomozamites* (?) *Zamiopteris* cf. *glossopteroides*. *Asplenium* cf. *whitbiense*. Bituminous shale.

The striking resemblance between this series of plant-remains from near Cape Stephen, and those described and figured by Professor Schmalhausen from Lower Tunguska, can only lead to the inference that they are approximately of the same age. This Tunguska flora was at one time supposed to be Palæozoic, but Professor Schmalhausen afterwards regarded it as of Oolitic age, and even referred it to the great Oolite.†

There is no stratigraphical evidence available which might indicate the position of these plant-beds at Cape Stephen, and the distance between them and Cape Flora prevents any correlation with the strata there exposed, as we know nothing of the possibilities of the change of dip or

* Compare also with *Gangamopteris*. See Seward, *Quart. Journ. Geol. Soc.*, vol. liii., p. 324 (1897).

† [Mr. Seward, in the *Quart. Journ. Geol. Soc.* (vol. liii., p. 325, 1897), says that the rocks described by Schmalhausen are probably of Permian age (see Zeiller, *Bull. Soc. géol. France*, ser. 3, vol. xxiv., p. 466, 1896). If this be so, then the series of plant-remains from Cape Stephen, which are so similar to those from the Tunguska deposits, may prove to be of the same age. But an Oolitic facies in the case of Permian Carboniferous plants is so remarkable that, in the absence of some characteristic form, such as the *Sigillaria* described by Mr. Seward from the South African beds, it would hardly be safe to regard these Cape Stephen plant-beds as of Permian age.]

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faulting which may occur in the twenty miles which intervene. At the same time it may be remembered that the probable northeasterly dip of the beds in Franz-Josef Land would, if correct, bring these beds some little distance below horizon No. 5 at Cape Flora, where, indeed, beds of Lower Oolite age might be expected to occur.

Bituminous paper-shales occur in close relation with these sandstone plant-beds at the locality between Cape Stephen and Cape Grant, sometimes called "Tween Rocks," but it is not known whether they are merely in restricted patches or occur as regular beds. This shale contains a large amount of combustible matter, and burns with a good flame.

Near the spot at "Tween Rocks" where the plant-bed was found, a bed of coaly lignite was discovered at a height of about 300 feet above the sea. This, Mr. Fisher tells us, was undoubtedly *in situ*. A stream of water had cut a channel for itself in the almost perpendicular cliff, and had exposed this stratum, a good-sized block of which has been sent home, but is now split into many pieces, a consequence, probably, of its having been frozen. This coal burns with a good flame, and was recognized by the discoverers as a possible supply of fuel. It is not merely a lignitized tree-stem, but is composed of crushed and compacted vegetable matter. One point of interest about this coal is that in part macrospores can be seen with a lens, reminding one of the "spore coal" so commonly met with in "coal measure" coal; and on examination with the microscope this portion of the lignite was found to be largely made up of micro- and macrospores.

This coal-seam, so far as we can judge, occurs about 300 feet above the sandstone which has yielded the plant-remains, and it may be that it belongs to beds of about the same period. A similar lignite, or coal, was found on the moraine at Cape Richthofen, but it is not certain that it contains macrospores.

There is still a specimen from Cape Stephen which has to be noticed, but as it was obtained from the talus at 300 feet above the sea, it is evident that it must have been derived from a bed situated at that or some greater elevation. The specimen is a slab about 10 inches square and $1\frac{1}{2}$ inch thick, wholly composed of layers of plant-remains completely silicified. It is black throughout, but one surface is weathered white. The greater part of the plants are straplike leaves from 4 to 9 mm. wide, and the longest piece measures about 110 mm., but none are perfect at the ends; the broadest leaf has eleven longitudinal ridges. They remind one of *Baiera* and *Podosamites*, but there is no evidence of their mode of attachment, and their true affinities are uncertain.

On this slab there is a fanlike leaf which is believed to be an undivided *Ginkgo*-leaf, like that of *G. integriscula* from Jurassic beds in Spitzbergen,*

* Heer, *Flora Fossilis Arctica*, vol. iv., pt. i., p. 44, and pl. x., figs. 7-9 (1877).

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but it has a still closer resemblance to *G. reniformis*, Herr, from Tertiary beds on the Lena.* As the identity of this *Gingko* is not established, it can only be taken as an indication of the possibility of the specimen being of Tertiary age, and the other plants on the slab do not seem to militate against this. The piece of a conifer-branch close to the *Gingko* might be of almost any age. It is quite possible, on the other hand, that this slab has been derived from a bed representing at Cape Stephen the Upper Jurassic plant-bed of Cape Flora. Finally, it may be that this silicified slab is of the same age as the silicified wood which is so abundant in Franz-Josef Land, but the age of the wood is yet to be settled.

8. CAPE CROWTHER

Cape Crowther, which is twelve miles northwest of Cape Grant, has been visited, but the only specimens that we have received from that locality are a piece of the ubiquitous silicified wood, a mass of silicified plant-remains, and some black-banded chert containing vegetable tissue. These fossils were not found in place, but were picked up from the highest raised beach.

9. CAPE NEALE

About six miles still farther northwest is Cape Neale, the most westerly point from which we have received specimens. On the summit of this headland, which reaches a height of 700 feet, there is a level plateau free from snow, and from here we have received some silicified wood which is stated to be part of a large black block found protruding from the soil. With this wood were some black flinty specimens containing plant-remains and likewise fragments of what looks like siliceous sinter. The upper 250 feet of Cape Neale is formed by basalt, and it was on this that the fossil was found.

10. HOOKER ISLAND

Hooker Island, which lies about twenty miles northeast of Northbrook, has been visited by Mr. Jackson with some of his party, and on the higher raised beach, as Mr. Fisher tells us, several small flints and cherty specimens were obtained from the "soil," which soil is formed of disintegrated basalt. The flints and cherty specimens all seem to contain traces of vegetable tissue, but this is very indistinct.

11. CAPE RICHTHOFEN

During Mr. Jackson's journey to the north a number of specimens were collected and labelled 80° 51' N. and 53° 40' E., which, according to the map, seems to be at or near Cape Richthofen. The specimens were found

* Heer, *Flora Fossilis Arctica*, vol. v., pt. ii., p. 32, and pl. viii., figs. 24-25 (1873).

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on the top of a lateral moraine which is said to be 300 feet high and 500 yards wide, but the height above the sea is not stated. The specimens are fragments of basalt, rotten vesicular basalt, brown sandstone, cherty nodules, lignite, friable sandy shale with plant-remains, and a small mass of compressed vegetable remains. About some of these a few words may be said, but it is unfortunate that they were not *in situ*.

One of the nodules (No. 345) is a gray and white cherty flint, which under the microscope is seen to be chalcedonic and contains some indistinct foraminifera which remind one of *Rotalia*, but they are not sufficient for determination and give no clew as to age. The latter remark may be also applied to the large sponge-spicules seen in a second cherty nodule, which looks like one of the "glass-rope" sponges.

Two of the pieces of lignite are really pieces of tree stems or branches retaining the outward form, but they are so much altered and in so friable a condition that their microscopic structure has largely been obliterated. It is not quite certain what the wood is, but an appearance which may represent spiral fibres and single rows of disks points to the possibility of its being allied to the yew-tree.

Some of the lignite seems to be composed of fragmentary vegetable matter, and is not unlike that from near Cape Stephen, which contains the macro and micro spores.

There are several pieces of sandy shale which is exceedingly friable, and almost black with carbonized vegetable remains; but these remains are so altered that at present nothing distinct has been made out, and the nature of the plants is uncertain.

The compressed mass of plant-remains is very recent looking; it is mixed with a little muddy matrix, and readily breaks up on soaking in water; when this is done the mass separates into small pieces, perhaps $\frac{1}{8}$ inch wide, and, say, 1 inch or less in length, flat, and as thin as paper. With these are other fragments, broader, but, like the first, so much altered that nothing can be made out of them. Mr. Clement Reid, who is so familiar with Pleistocene plants, has seen these, and feels sure that they are not so recent as Pleistocene, but thinks that they might be of Tertiary age. Dr. Nathorst, judging by the absence of dicotyledons, is of opinion that they belong to the Jurassic period.

RAISED BEACHES

The occurrence of raised beaches in many places in Franz-Josef Land is well established. One was noticed by Mr. Leigh Smith at Gray Bay, west of Cape Grant, 90 feet above sea-level. Mr. Jackson's hut at Elmwood is on an old sea-beach 40 to 50 feet above the sea, while there are others at higher and lower levels. The bones of a whale (probably *Balæna mysticetus*) are mentioned as being found near Mr. Jackson's hut. Similar raised beaches occur on Frederick Jackson Island, showing that the

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movement of upheaval is not confined to the southern parts of Franz-Josef Land, where most observations have been made. At the northern end of Gunther's Bay raised beaches were observed by Dr. Koettlitz, and from the lower one pebbles of basalt and specimens of *Saxicava arctica* were collected; similar beaches were also seen by the Jackson-Harmsworth party at Cape Crowther, at Cape Stephen, at Hooker Island, and at Windy Gully; from the latter, *Trophon antiquus*, *Tr. gracilis*, *Mya arenaria*, and *Balanus concavus* were obtained.

SILICIFIED WOOD

The common occurrence of silicified wood has been noticed by all who have visited Franz-Josef Land. Lieutenant Payer alludes to it; Mr. Leigh Smith and Mr. Grant collected specimens; the first consignment of fossils from the Jackson-Harmsworth expedition contained some fine specimens; Dr. Nansen also notices it; and the present series of specimens from the Jackson-Harmsworth party includes many examples, some of which are large and formed part of a tree-stem.

This silicified wood is widely distributed in the Franz-Josef archipelago, for Lieutenant Payer's specimens must have been from the eastern islands, while we have evidence of it from Capes Flora, Crowther, Neale, and Gertrude. Mr. Leigh Smith's specimens seem to have been found on Mabel Island. In nearly every case this wood has been found on the talus-heaps, and the only place where it has been found *in situ* is at Cape Gertrude, where Dr. Koettlitz and Mr. Child discovered a mass of it embedded in the lower part of the basalt at a height of more than 700 feet above the sea. On the plateau at the summit of Cape Neale, which is 700 feet above the sea, a large silicified tree-trunk was found projecting from the soil, and therefore above the 250 feet of basalt which there caps the cape.

It is difficult to assign any age to this wood. It is possible that a Tertiary basalt overwhelmed forests of pines growing at that time, and that the same kind of trees subsequently grew on the surface of the sheets of basalt. Or it may be that some already existing plant-beds were invaded by the intruding basalt, in which case the moving mass might in some instances have passed over, and in others passed under, the plant-bed; or there may have been more than one such bed.

It is wellnigh certain that this silicified wood is not earlier than Upper Jurassic, for it almost certainly occupies a position above the Oxfordian fossil-bed; but of this we have no positive proof, seeing that the beds exposed at Cape Gertrude have yielded no fossils to indicate their age. It is quite possible, therefore, that some of this silicified wood may be of Upper Jurassic, Cretaceous, or Tertiary age. On the whole, it seems most in accordance with the known facts to regard it as of approximately the same age as the basalts, which are probably of Tertiary date.

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Judging from the report of Mr. Leigh Smith's visit to Franz-Josef Land,* and Mr. Etheridge's remarks in the discussion,† it was thought that the pine-cone, the silicified wood, and the plant-impressions there mentioned were all from one horizon; but no evidence was brought forward proving that such was the case. Mr. Carruthers, who examined the pine-cone, was of opinion that it was of Cretaceous age; and the presence of Cretaceous rocks in Franz-Josef Land rests upon that opinion. It is by no means clear, however, that the silicified wood is Cretaceous, even if the evidence of the pine-cone be accepted; but there now seems to be some doubt as to the age of the cone.

The manner in which this silicified wood is preserved merits attention; in some cases the replacement by silica has been so brought about that the form of the finest tissues is extremely well preserved, and, being of a dark brown color, sections under the microscope show their structure even better than recent wood. The large longitudinal cells of the woody tissue are clearly defined, as are also the medullary rays which cross them, but the feature which is the most striking and at the same time the most characteristic is the well-marked series of disks (dotted tissue) which are typical of coniferous wood, and are in this instance large, and arranged in single and double rows in the cells. Transverse sections show the usual annual rings.

There is much difference in the degree in which the finer tissues of this fossil wood are preserved, some examples, like that above described, seeming to have every feature of the original structure retained, while in others this is nearly or quite obliterated. Some sections of black flinty fragments which have been examined have traces of tissue so faint as to leave doubt concerning its vegetable origin; and there are many intermediate stages between the two extremes. It may be mentioned also that silicified masses of vegetable matter other than wood have been collected, but these may not be of the same geological age. One such block, from the talus at Cape Stephen, on which there is a leaf of *Gingko* and a piece of a pine-branch, has already been noticed.

The preservation of this wood in close relation to the basalt is of much interest, for it is not only in Franz-Josef Land that there is this association, but it has been noticed in many other places. Under very similar conditions wood has been found interstratified with the basalts of Greenland; the same conditions are present in the western islands of Scotland, where *Pinus eiggenensis*, sometimes silicified and sometimes preserved in carbonate of iron, occurs under the Scur of Eigg, as described by Hugh Miller in the *Cruise of the "Betsy"*; and coniferous wood was found by Sir A. Geikie under the basalt in the Island of Canna.‡

* *Proc. Roy. Geogr. Soc.*, n. s., vol. iii., p. 105 (1881).

† *Ibid.*, p. 147.

‡ *Quart. Journ. Geol. Soc.*, vol. lii., p. 362 (1896).

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The common occurrence of silicified wood on the shores of Lough Neagh, Ireland, is well known, and is stated to be derived from clays which are there found under the basalt.* Silicified wood has also been met with in the basalt of the Giant's Causeway.

It would be interesting to know whether similar conditions have existed in other places where silicified wood has been so abundantly found, such as near Cairo, in Antigua, in Arizona, in Tasmania, etc. In some of these localities volcanic conditions do obtain, but further information as to the precise relation of the silicified wood to the volcanic rocks is desirable.

In addition to the specimens above described, the collection contains material from the surface of a floe, 48 miles south of Bell Island, and from the under surface of an iceberg found, tilted up, off Eira Cottage.

That from the floe is a brown mud composed of extremely fine, brownish, amorphous particles, with which a few diatoms are associated. A partial analysis gave the following result :

SiO ₂	49.88
TiO ₂	.28
Al ₂ O ₃	18.06
Fe ₂ O ₃	9.14
CaO	3.00
MgO	2.20
Loss on ignition	13.88
	96.44

The material from the iceberg is a greenish sand, containing shells and fragments of *Mya truncata*, *Balanus concavus*, *Balanus porcatus*, and *Saxicava arctica*; also some small subangular pebbles. The sand is principally composed of quartz and felspar, but contains also hypersthene, zircon, iron-ores, rutile, tourmaline, and garnet. The subangular pebbles are formed of basalt, sandstone, and black radiolarian chert. A section of the chert has been examined by Dr. G. J. Hinde, F.R.S., who has kindly furnished us with the following description :

"The thin section of the small-rolled pebble of light-colored chert from Franz-Josef Land is seen under the microscope to be filled with casts of radiolaria. The structure of these organisms, as is usually the case, is now entirely obliterated, and they appear as minute, transparent bodies, with circular, oval, or discoidal outlines in the cherty matrix. Most of them are smooth, but a few have projecting spines. They

* See W. W. Watts, *Guide to the Collections of Rocks and Fossils in the Museum of Science and Art*, p. 69 (1895).

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range from 0.06 to 0.19 mm. in diameter; in general, the forms are relatively smaller than those usually met with in a chert. Judging from their outlines, several genera are represented in the section; the most numerous are the simple round and oval forms belonging to *Cenosphaera* and *Cenelipsis*, and the rarer spined ones may be probably referred to *Xiphostylus* and *Dorysphaera*. Though the horizon of the rock from which this pebble comes cannot be positively determined from these imperfectly preserved radiolaria, it is not improbably of Palæozoic age. The character of the chert itself is precisely similar to that of the radiolarian chert of the Palæozoic rocks of Devon, Cornwall, and the south of Scotland."

It is a curious circumstance that among the few specimens brought from Joinville Island in the Antarctic region, south of the Falkland Isles, was one of radiolarian chert; thus this rock has been found, though not *in situ*, in the most northerly and most southerly lands yet visited.

Rocks showing cone-in-cone structure are very abundant near Cape Flora, and have been found at several localities. Numerous specimens have been collected, but unfortunately not one of them was found in place, so that the exact horizon from which they come cannot be determined. As they are found all round the cape, and sometimes high up on the talus, it is probable that they form a band or bands situated not far below the basalt.

The rock is an argillaceous limestone, and the carbonate, which has produced the structure by its attempts to crystallize under unfavorable circumstances, is rich in lime and poor in iron and magnesia.*

VI. THE RELATIONS OF THE VARIOUS FOSSILIFEROUS HORIZONS

In order to give some idea of the relations of the various beds of fossils above noticed, and of their probable place in the geological sequence, a vertical section has been made of the strata at Cape Flora, relying upon the various heights above the sea, at which the different beds are said to occur, for the position of these beds in the section; but it must be remembered that the figures supplied to us are only approximately accurate, and are liable to correction by further measurements.

The sedimentary strata in the south of Franz-Josef Land are believed to be regularly horizontal, with only a slight dip to the northeast, and consequently within the area of Cape Flora it is unlikely that there will be any serious variation in the height of the same bed at different parts of the cliffs.

* See G. A. J. Cole, "On some Examples of Cone-in-cone Structure," *Min. Mag.*, vol. x., p. 136 (1892).

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Cape Flora is said to be 1100 feet high; the upper 500 feet is basalt, while the lower 600 feet is made up of sedimentary rocks, covered for the most part by talus. The base of the basalt is thus placed at 600 feet above the sea, and the positions of some of the beds, as we shall see, are reck-

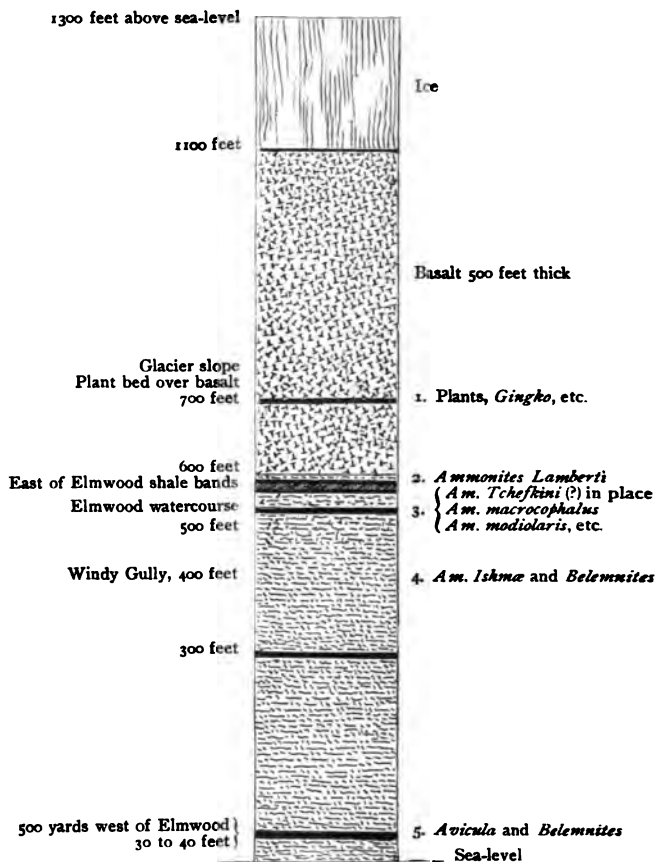


DIAGRAM SECTION OF STRATA SEEN AT CAPE FLORA

oned by their distance below the basalt. Thin beds of basalt are said to occur in the clay-beds, but as the exact position of these is not stated, they are left out of the section; and for the same reason the seams of coaly lignite noticed in these clay-beds are omitted.

There is one horizon, however, the age and position of which are definitely known. It is that which occurs at the back of Elmwood at about

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fifty feet below the base of the basalt. At this spot a bed (No. 3) was found *in situ*, and from it a small ammonite was obtained, which is probably *Ammonites Tchefkini*. In the watercourse below this exposure similar ammonites were found, together with *A. modiolaris* and *A. macrocephalus*. These suffice to settle the age as Lower Oxfordian, and probably the equivalent of our own Kellaways Rock. Although only one ammonite was really found *in situ*, yet it is sufficiently certain that the others, if not from the same place, came from beds but little lower in the series. Similar fossils to these occur in the talus at many places around Cape Flora, showing the probability of the same beds being present all round the cape.

The belemnites which were collected during the *Eira* Expedition by Mr. Grant, apparently on Mabel Island, and said to be of Oxford Clay age, probably belong to this horizon.

How much of the beds above and below the *Ammonites macrocephalus* horizon is to be included in the Lower Oxfordian one cannot say, no distinctive fossils having been found. The thin bands of shale (No. 2) which occur just above the *A. macrocephalus* horizon and close under the basalt have yielded no fossils.

On the north side of Cape Flora, at a height of about 700 feet, the bed with plant-remains (No. 1) occurs. It is said to be *in situ*, and overlying a mass of basalt projecting through a glacier. This locality is about a mile northwest of Elmwood—that is, on the supposed strike of the beds. It is, therefore, included in the section at the height given. It is difficult to decide whether this plant-bed should be included in the Oxfordian or not. Dr. Nathorst's opinion—that it is of Upper Jurassic age—carries great weight. If the basalt be intrusive, then the two beds (1 and 3) may originally have been nearer together than they are now. We must await further evidence before this point can be fairly discussed. In the meantime these plant-bearing shales are the highest fossiliferous horizon that has yet been found in place in Franz-Josef Land.

The specimens of *Ammonites Ishma* discovered at Windy Gully, at 300 feet above the sea, are believed by Dr. Koettlitz to have been in place—that is to say, he is of opinion that they belonged to the bed on which they were found. This horizon, therefore, is placed in the section at 300 feet above the sea, and is thus 250 feet below the *Ammonites modiolaris* bed, but this distance may be too great. The ammonites and belemnites of this bed are not of the same species as those found in the *Ammonites macrocephalus* and *A. modiolaris* horizon; and it is quite possible that we may have in this *A. Ishma* bed a representative of another formation, perhaps of the age of the Cornbrash.

The lowest horizon seen at Cape Flora is the bed exposed at about thirty to forty feet above the sea, a little to the west of Elmwood (No. 5). Except for the fact that this bed is situated some 250 feet lower in the series than

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the place where *A. Ishma* was found, there is nothing to give a clew to its geological horizon. The large *Avicula* has not been identified, and the belemnites, although resembling those found with *Ammonites Ishma*, are not perfect enough for identification.

The numerous thin beds (No. 6) at Cape Gertrude, that occur at a height of from 400 to 600 feet above the sea, having yielded no fossils to indicate their age, cannot be correlated with the section at Cape Flora; and it is only their elevation above the sea that points to a possible correspondence with the *Ammonites macrocephalus* and *Ammonites modiolaris* series.

We now come to what seems to be the lowest horizon from which fossils have been collected in Franz-Josef Land—namely, the plant-bearing sandstone at Cape Stephen (No. 7), which was also found exposed farther southwest, towards Cape Grant. As this locality is more than twenty miles west of Cape Flora, and the structure of the intervening islands is not known, it is hazardous to attempt to correlate the beds at the two places. But, at the same time, if the strata of the south of Franz-Josef Land are uniform in their northeasterly dip, then, as this plant-bed is near the sea-level at Cape Stephen, we should expect to find it or its equivalent at some distance below the sea at Cape Flora; and the possibly Lower Oolite age of the plants points to a similar position in the series. On the other hand, as already pointed out, these beds may be of much greater antiquity.

The presence of a plant-bed at the top of these Oolitic strata of Franz-Josef Land, and the occurrence of lignite-beds in many places below, show that estuarine if not, indeed, fresh-water conditions must have prevailed during a large part of the time when they were being deposited; but, on the other hand, the horizons with *Ammonites* and *Belemnites* point to times when marine depositions intervened.

Strata of Oolitic age have been met with in Spitzbergen by Professor Nordenskjöld,* and the presence of *Ammonites triplicatus* would seem to indicate that they belong to higher beds than have been recognized in Franz-Josef Land, unless indeed they correspond with the upper plant-bed of Cape Flora.

More recently, two species of Jurassic ammonites have been recognized from Spitzbergen by Dr. Fraas,† namely *Ammonites triplicatus* and *A. cordatus*, from which one can only conclude that beds are present which in Britain would be called Upper Oxfordian.

Numerous Jurassic fossils were collected by Professor Nordenskjöld in Novaya Zemlia, and have been described by Professor Tullberg.‡ Among

* *Sketch of the Geology of Spitzbergen*, p. 27 (1867).

† *Neues Jahrb.*, p. 203 (1872). See also Raymond and Dollfus, *Geol. Spitzbergen. Feuille des Jeunes Naturalistes*, Nos. 286, 287, 288 (1897).

‡ *Verstein. Nowaya Semlya, Bihang till Svenska Vetenskap. Akad. Handl.*, vol. vi., pt. ii. (1880).

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these *Ammonites alternans* is found, thus indicating the presence of beds of Kimeridgian age in that country.

The question of the age of the silicified wood has already been alluded to, and little further can be said. The occurrence of this wood below the basalt and near to probable Jurassic deposits shows that some of it may perhaps be of Jurassic age; but it may equally well be of Cretaceous or Tertiary date. Even if future discoveries confirm the supposed Cretaceous age of the pine-cone from Bell Island, this will not necessarily prove the silicified wood to be of the same age.

The possibility of Tertiary beds being present is shown by the silicified slab from Cape Stephen, the *Gingko* seeming to be the same as *G. reniformis*, which is from beds believed to be of Tertiary age.

The plant-remains found near Cape Richthofen may likewise be of Tertiary age, as already mentioned, but the evidence is so slender that it must be taken rather as a suggestion of something to be looked for in the more northern parts of Franz-Josef Land than as a proof of the presence of beds of so late a date. The fact that beds with abundant plant-remains of Tertiary age have been found in Spitzbergen shows that similar deposits may be expected here. It will be remembered that the specimens from Cape Richthofen were found upon a high lateral moraine, and therefore presumably were derived from beds directly above this moraine, or it may be were brought from a distance; in either case it is quite possible that they may yet be found *in situ*. The plant-remains themselves have a very recent look, but it is hardly likely that they can be more recent than the Glacial period; indeed, Mr. Clement Reid's opinion goes far to show that they are of earlier date than Pleistocene, and may be Tertiary, or even, as Dr. Nathorst thinks, of Upper Jurassic age. These plants, however, are so poorly preserved, and their place of origin is so uncertain, that we can only hope for additional specimens which may throw light upon this interesting but obscure question.

VII. CONCLUSION

In conclusion, we may perhaps be allowed to sketch out briefly the salient features in the geological history of Franz-Josef Land, so far as this can be done in the light of our present knowledge. Passing over the plant-bed at Cape Stephen, the age of which is uncertain, the first event of which we have any record is the deposition of a series of shales and sandstones containing plant-remains, beds of lignite, and other evidences of littoral or estuarine conditions. Intimately associated with these shallow-water deposits are some purely marine beds, the age of which is placed beyond all doubt by the occurrence of such well-characterized zonal fossils as *Ammonites macrocephalus* and *A. modiolaris*.

Owing mainly to the brilliant researches of Neumayr,* it is now generally

* "Die geographische Verbreitung der Juraformation," *Denkschr. d. k. Akad. d. Wiss.*, Wien, vol. I., pp. 57-142 (1885).

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recognized that the Jurassic sea reached its greatest extension in the present land areas during the Callovian and Oxfordian periods. Hydrocratic and geocratic movements alternated during Jurassic times, with a decided balance in favor of the former, and a recession of the coast-line towards the north. Even in the north of Scotland we find no decided evidence of the proximity of land during the Oxfordian period, although the lower portions of the Jurassic formation are represented by littoral and estuarine deposits.*

Under these circumstances the discovery of *A. macrocephalus* beds in Franz-Josef Land in association with plant-bearing strata is of special interest. It extends the range of this ammonite several degrees towards the north, and shows, in all probability, that during the period of its existence a coast-line lay somewhere in this direction. Marine deposits of Callovian and Oxfordian age are now known to range from Sutherland to Cutch and from Franz-Josef Land to the north of Africa; and *A. macrocephalus* is one of the most widely distributed of all Jurassic ammonites.† The soft Jurassic sediments were subsequently covered up and preserved from destruction by vast flows of basaltic lava; and it is not a little remarkable that rocks of the same general period have been preserved in the same way in districts so far removed from Franz-Josef Land as the northwest of Scotland‡ and Abyssinia.§ We have already pointed out that Dr. Nansen refers the basalt in part to the Jurassic period; but in view of the fact that the basalts of the west of Scotland were at one time supposed to be of the same age, for reasons very similar to those relied upon by him, this conclusion cannot be regarded as definitely established. At the same time it is important to notice that, if we except the north of Ireland, the Upper Cretaceous period is unrepresented, or but feebly represented, by sedimentary deposits in regions like the Deccan of India and the high plateaux of Abyssinia, where basalts are extensively developed. It is, therefore, quite possible that the vast outpourings of basic lavas which have given a special character to extensive areas of the earth's surface| may have commenced in pre-Tertiary times.

* J. W. Judd, "The Secondary Rocks of Scotland," *Quart. Journ. Geol. Soc.*, vol. xxix., p. 164 (1873), and vol. xxxiv., p. 726 (1878).

† It not only occurs in central and southern Europe, northern Russia, and Franz Josef Land, but also in Cutch (Waagen, *Pal. Indica*, ser. ix., vol. i., 1873) and Bolivia (Steinmann, *Neues Jahrb., Beilage-Band*, i., p. 239, 1881). It has also been recorded from western Australia (Moore, *Quart. Journ. Geol. Soc.*, vol. xxvi., p. 226, 1870), but Neumayr throws doubt on the identification (*op cit.*, p. 118).

‡ J. W. Judd, "The Secondary Rocks of Scotland," Second Paper, *Quart. Journ. Geol. Soc.*, vol. xxx., p. 220 (1874).

§ Aubry, "Observations géologiques sur les Pays Danakils," etc., *Bull. Soc. géol. France*, ser. 3, vol. xiv., p. 201 (1886).

| The Deccan traps cover an area of about 200,000 square miles. *Geology of India*, 2d. ed., p. 256 (1893).

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The present configuration of the archipelago of Franz-Josef Land conclusively proves that it is formed of the fragments of an old plateau. The land frequently ends off in very high cliffs, capped with sheets of basalt which must have extended far beyond their present limits. When one compares the topography of this district with that of the Faroes and the west of Scotland, one is inclined, notwithstanding the immense tracts of water which now separate these localities, to ask whether they may not at one time have been continuous, and whether the northern portion of the north Atlantic, as suggested by Suess,* may not be of comparatively recent origin.

But whatever answer may be given to this question, it is clear that at the close of the volcanic period the various islands of Franz-Josef Land were united and formed part of an extensive tract of land. This land was subsequently broken up, partly, in all probability, by the sinking of certain areas along lines of fault, and partly by denudation.

The final stages in the history of the district are represented by the raised beaches, which prove that this region, like so many other portions of the extreme north, has quite recently been under the influence of a geocratic movement.

* "Are Great Ocean-Depths Permanent?" *Natural Science*, vol. ii., p. 185 (1893).

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ABSOLUTE DECLINATIONS AT CAPE FLORA

BY A. B. ARMITAGE

1896				1896				1896			
o ' "				o ' "				o ' "			
June	30	.	14 50 3	Oct.	4	.	15 0 25	Nov.	10	.	14 48 1
July	1	.	17 44 53	"	4	.	15 31 24	"	11	.	14 26 45
"	2	.	15 30 29	"	5	.	15 9 5	"	11	.	15 52 6
"	2	.	15 00 23	"	5	.	15 22 24	"	12	.	14 29 16
"	4	.	16 35 33	"	6	.	15 16 54	"	13	.	14 7 55
"	4	.	13 53 31	"	6	.	14 51 24	"	16	.	14 48 53
"	5	.	15 57 48	"	7	.	14 58 7	"	16	.	14 44 2
"	5	.	15 1 8	"	7	.	5 47 37	"	20	.	14 53 23
"	6	.	14 38 15	"	8	.	15 4 19	"	23	.	15 5 53
"	6	.	14 35 59	"	8	.	14 6 24	"	24	.	15 32 13
"	7	.	15 17 31	"	9	.	15 38 32	"	27	.	15 25 59
"	7	.	16 1 12	"	10	.	17 14 35	"	30	.	15 12 45
"	8	.	15 6 54	"	11	.	15 32 36	Dec.	2	.	14 31 57
"	8	.	15 23 58	"	12	.	15 13 43	"	2	.	15 2 11
"	9	.	15 13 57	"	12	.	16 14 43	"	3	.	14 38 6
"	9	.	14 47 53	"	13	.	15 18 38	"	3	.	14 4 4
"	10	.	14 19 6	"	13	.	15 56 1	"	4	.	16 33 48
"	11	.	14 4 25	"	14	.	15 35 33	"	4	.	13 40 27
"	11	.	14 33 28	"	15	.	15 8 14	"	8	.	14 29 8
"	12	.	13 42 48	"	15	.	15 8 27	"	8	.	15 35 46
"	12	.	14 7 43	"	16	.	15 43 20	"	9	.	14 36 15
"	13	.	14 32 50	"	16	.	14 15 13	"	9	.	13 26 18
"	13	.	14 41 38	"	18	.	15 27 58	"	10	.	14 26 44
"	14	.	14 58 35	"	19	.	16 15 3	"	11	.	14 23 48
"	14	.	15 43 6	"	19	.	15 26 37	"	13	.	16 3 35
"	15	.	15 8 57	"	20	.	15 37 3	"	13	.	14 52 33
"	15	.	14 56 13	"	20	.	15 36 50	"	14	.	14 13 46
"	16	.	15 30 48	"	21	.	15 7 25	"	15	.	14 48 49
"	16	.	14 17 41	"	21	.	15 12 54	"	16	.	15 6 58
"	18	.	14 36 00	"	22	.	15 25 52	"	17	.	14 26 7
"	20	.	15 00 51	"	22	.	15 26 58	"	17	.	15 15 57
"	20	.	14 58 56	"	23	.	14 58 11	"	18	.	14 56 30
"	21	.	14 57 23	"	26	.	17 6 34	"	21	.	14 23 33
"	21	.	15 10 19	"	26	.	16 52 27	"	22	.	14 26 7
"	22	.	15 6 44	"	27	.	16 56 40	"	24	.	14 16 43
"	22	.	15 13 19	"	27	.	15 15 24	"	26	.	15 5 44
"	23	.	15 11 56	"	28	.	15 29 20	"	28	.	14 22 9
"	23	.	15 20 38	"	28	.	15 16 5	"	30	.	14 0 29
"	25	.	15 13 16	"	29	.	15 28 32	"	31	.	14 11 26
"	25	.	15 8 15	"	30	.	15 50 31				
Sept.	27	.	15 9 43	Nov.	3	.	15 11 24				
"	28	.	15 28 50	"	3	.	15 16 57				
"	28	.	15 26 50	"	4	.	15 12 57	Jan.	1	.	14 33 29
"	29	.	15 27 32	"	4	.	15 2 10	"	2	.	12 37 9
"	29	.	15 4 29	"	5	.	15 21 48	"	3	.	13 48 41
"	30	.	15 14 59	"	5	.	14 56 32	"	4	.	14 26 48
"	30	.	15 19 14	"	6	.	16 31 5	"	5	.	14 29 38
Oct.	1	.	14 44 25	"	6	.	14 12 40	"	7	.	14 35 30
"	1	.	15 10 43	"	7	.	11 57 18	"	8	.	14 26 45
"	2	.	15 15 43	"	9	.	16 19 34	"	10	.	14 30 25
								"	12	.	14 15 26

APPENDIX

TEMPERATURES OF SOIL, WATER, ETC.

TAKEN BY H. FISHER

		Local Mean Time	° F.
1896			
Midsummer Day, }	Sandy soil 3 in. below surface . . .	Noon	+44
June 21 . . }	Sandy soil 6 in. below surface . . .	Noon	+40
	Sunk in a bed of snow at sea-level, 12 in.	1 P.M.	+32
	Running water (rill with ice bottom)	1 P.M.	+32
	in shade		
	Pool of water having no streams running	Noon	+41
	into it. 80 yards long, by 40 yards		
	wide. 6 inches below surface . . .		
	Air, at 43 ft. (In screen 34° F.) . .	Noon	+36
	Sun trying to break through clouds and	1 P.M.	
	almost succeeded by		
June 22 . . .	Elmwood Tarn	7.30 P.M.	+43.5
	Smaller pool (3 in. deep)	7.30 P.M.	+44.5
	Air	7.30 P.M.	+35.5
	Light airs W. by N. Showers of rain	7.30 P.M.	
	at intervals, dull, misty		
June 30 . . .	Tarn.	9.45 P.M.	+48
	Air. Sun shining all day	9.45 P.M.	+32
July 2 . . .	Tarn.	7 P.M.	+46
	Shallow pool	7 P.M.	+50
	Air	7 P.M.	+35
July 9 . . .	Tarn.	4.15 P.M.	+54
	Shallow pool	4.15 P.M.	+58
	Air. Very brilliant sunshine all day .	4.15 P.M.	+35

A THOUSAND DAYS IN THE ARCTIC

TEMPERATURES OF SOIL, WATER, ETC.—*Continued*

		Local Mean Time	° F.
1895			
Midsummer Day, } June 21 . . . }	Alt. 40 ft. Sandy soil 3 in. below surface	8 P.M.	+38
	Alt. 40 ft. Sandy soil 4 in. below surface	8 P.M.	+36
	Alt. 40 ft. Damp stony soil 6 in. below surface	8 P.M.	+33.5
	Alt. 40 ft. Damp stony soil 6½ in. below surface	8 P.M.	+32.8
	Alt. 80 ft. Snow on flat ground 12 in. below surface	8 P.M.	+31
	Alt. 60 ft. Running water 10 in. below surface	8 P.M.	+32.5
	Alt. 60 ft. Pool of water, having no streams running into it, 80 yards long by 40 yards wide, 6 in. below surface	9.45 P.M.	+39.5
	Alt. 60 ft. Air	9.30 P.M.	+31
	Alt. 60 ft. Earth 12 in. below surface	9.30 P.M.	+28.5
	Alt. 60 ft. Air	Noon	+33.8
	Alt. 60 ft. Air. Max. last 24 hours	Noon	+36.5
June 22 . . .	Bright sunshine. Strong breeze, force 5 to 6	2.30 P.M.	—
	Alt. 40 ft. Damp sandy soil 4 in. Strong breeze	2.30 P.M.	+37.5
	Alt. 40 ft. Damp greasy loam 4½ in. Strong breeze	2.30 P.M.	+32.0
	Alt. 40 ft. Damp greasy loam 2 in.	2.30 P.M.	+35.0
	Alt. 40 ft. Damp greasy loam 1½ in.	2.30 P.M.	+38.0
	Alt. 40 ft. Air in screen	3 P.M.	+35.0
	Alt. 40 ft. Stone soil top of bed 5½ in.	3 P.M.	+35.0
	Alt. 40 ft. Pool of water (tarn) W. end	3 P.M.	+44.0
	Alt. 40 ft. Pool of water (tarn) S.S.W. side	3 P.M.	+45.0
	Alt. 40 ft. Shallow pool, 3 in. deep. Bright sunshine, strong N.W. wind	4.30 P.M.	+46.0
June 24 . . .	Minimum temperature of air	4.30 P.M.	+25
June 25 . . .	Air	4.30 P.M.	+24.5
June 26 . . .	Ice on puddles of water, ½ in. thick	10 A.M.	—
	Tarn	2 P.M.	+41.5
	Shallow pool, 3 in.	2 P.M.	+43
	Air	2 P.M.	+30
	Alt. 250 ft. Damp soil on talus 3 in. below surface	2 P.M.	+33
	Alt. 40 ft. Sandy soil 6 in.	2 P.M.	+25
	Alt. 40 ft. Sandy soil 3 in.	2 P.M.	+37

APPENDIX

TEMPERATURES OF SOIL, WATER, ETC.—*Concluded*

		Local Mean Time	° F.
1895			
June 26 . . .	Sunshine	1 P. M.	—
	Alt. 40 ft. Air. N.N.W. wind with snow at 2 P. M.	Noon	+31
	Tarn after five hours' snow with N.W. wind	6.30 P. M.	+34.5
June 27 . . .	Air	6.30 P. M.	+30
	Alt. 40 ft. Air	10 A. M.	+33.8
	Air	1 P. M.	+35
	Tarn	1 P. M.	+38.5
	Tarn	5.30 P. M.	+39
June 30 . . .	Air	5.30 P. M.	+33
	Alt. 40 ft. Air	Noon	+38.5
	Snowing slightly	5.30 P. M.	—
	Tarn, snowing slightly	5.30 P. M.	+45.5
	Sandy soil, 2 in. Snowing slightly	5.30 P. M.	+46
	Sandy soil, 3 in. Snowing slightly	5.30 P. M.	+43
	Sandy soil, 6 in. Snowing slightly	5.30 P. M.	+41
	Air. N.N.W. wind. Snowing slightly	5.30 P. M.	+37
	Shallow pool 3 in. N.N.W. wind	8 P. M.	+46
	Tarn. N.N.W. wind	8 P. M.	+45.5
	Tiny bog pool, 2 in. N.N.W. wind	8 P. M.	+43
	Air	8 P. M.	+37
	Max. air last 24 hours	8 P. M.	+40
	Ice on shaded water by Sharpe's Rock	10 P. M.	—
	Ice on puddles of water against house	Midnight	—
July 2 . . .	Cape Gertrude. Air	7 P. M.	+33
July 3 . . .	Air	1.30 P. M.	+29
	Air	2 P. M.	+39.5
	Air	8 P. M.	+39
July 4 . . .	Alt. 40 ft. Air	9.15 A. M.	+37.5
	Mossy and grassy spongy turf	9.15 A. M.	+41
	Sandy soil edge of turf	Noon	+48
	Pool in ice	6 P. M.	+37
	Water between bowlders and shore ice	6 P. M.	+49
	Running stream by tent	6 P. M.	+47
	During last night the streams stopped running.		
	Air	6 P. M.	+45
	Air	6.45 P. M.	+43
July 5 . . .	Air. East wind	9 A. M.	+37.5
	Snow at 7.45 A. M., hail at 9.15 A. M. Air (shade, sun shining in wind)	2.30 A. M.	+42
	Stream running through the night.		
July 6 . . .	Air	10 P. M.	+37
	Air	9 A. M.	+37.5
	Air	Midnight	+35
July 7 . . .	Air	2 P. M.	+39

TIDAL OBSERVATIONS TAKEN AT CAPE FLORA BY A. B. ARMITAGE

August 26, 1895.—High water 1.05 P.M. Height on pole, 1 ft. 7.2 in.

September 3d.—Low water at 4.28 P.M. Height on pole, 9.7 in.

September 4th.—High water at 9.47 A.M. Height on pole, 1 ft. 6.8 in.

September 4th.—Low water at 4.35 P.M. Height on pole, 5 in.

September 4th.—High water at 10.45 P.M. Height on pole, 1 ft. 7 in.

September 5th.—Low water at 4.07 P.M. Height on pole, 7.4 in. From 10-minute observations.

The tides here come in and run to the eastward, along the coast, with a rising tide, and go out and run to the westward with an ebb tide.

They are, however, greatly influenced by the winds in the above respect; and with a wind of force 6 and above from an easterly or westerly direction, will either remain neutral or flow slowly in an opposite direction to that which they generally take.

The winds also appear to effect the rise and fall of the tide.

The range of tide appears to vary between 1 ft. 1 in. and 1 ft. 3 in.

The highest tide registered on the tide-pole was on September 3d, at 9 A.M.—2 ft. 0.2 in.

The lowest tide registered was on August 27 at 9 P.M.—2.2 in.

The tide appears to turn and run to the westward about twenty minutes or half an hour before it has finished rising; and the same occurs before it has finished falling.

The tide moves very slowly at neaps, and is slack for a considerable period of time.

At springs it moves with rapidity, about 21–3 knots per hour; and there is practically no slack water.

POSITIONS OBTAINED BY OBSERVATIONS OF ☉ ON BOAT JOURNEY

JULY 11 TO AUGUST 12, 1895

	Latitude			Longitude W. of Cape Flora			Variation E.
	°	'	"	°	'	"	°
July 13 and 20 and August 5 at Cape Grant }	80	02	45	2	10	31	—
July 22 at Cape Crowther	80	10	36	3	01	01	—
July 23 and 28 at Cape Neale	80	16	18	3	23	55	11½
August 6 and 7 at Cooke Rocks	80	03	29	2	00	58	13½
August 8 and 9 at Cape Stephen	80	03	30	1	45	52	14
August 10 at Bell Island	80	02	29	0	54	15*	13½

* Worked with latitude 80° 02' 30".

REPORT ON THE FLORA OF FRANZ-JOSEF LAND FROM
CAPE BARENTS TO CAPE NEALE. BY MR. H. FISHER,
BOTANIST TO THE EXPEDITION

PHANEROGAMS

THERE are eleven small tracts of land on the southwestern shores of Franz-Josef Land, which are separated by glaciers. Four of the localities are on these islands, and others are on Alexandra Land. From the following account it will be seen that the flora is strikingly insular. There are no endemic types, but the glabrous state of *Luzula congesta* is not known elsewhere in Arctic or other regions. *Pleuropogon*, which was till now supposed to be confined to the Polar American islands and Novaya Zemlia, has unexpectedly turned up in Franz-Josef Land. Malmgren thought the north Spitzbergen flora seemed to be connected with Arctic America. *Pleuropogon* may have lingered on the one favorable spot, while other species have died out.

In warmer times a current may have passed over the pole between Polar America and Franz-Josef Land. There are so many peculiarities in the distribution of plants that any attempt to account for the presence of *pleuropogon* here seems to me useless.

Compared with other floras of polar regions, southwest Franz-Josef Land has fewer species than almost any other. There is a cold current running in a westerly direction, all the land being ice-capped.

There are no rivers or streams or lakes. Small rills and pools of water occur here and there, supplied by the melting snow.

The flora consists of 15 Dicotyledons and 8 Monocotyledons—8 natural orders, 15 genera, and 23 species.

Proportion of genera to species is as 1 to 1.53.

The following table may be of interest, showing as it does, from a botanical point of view, that Franz-Josef Land, though not the most barren region, as Payer supposed, is inferior to some others; but the early spring (March and April) being the only time he had for collecting, rendered it impossible for him to decide upon such a point:

APPENDIX

PHANEROGAMS

	<i>Species</i>
Spitzbergen	96
East Arctic Greenland	85
Grinnell Land	69
Melville Island	60
Islands north of Barrow Straits and Lancaster Sound	50
Melville Bay, Wolstenholme and Whale Sounds	23
Walden Island	9
Ross's Islet (Seven Islands)	0
Herald Island	4
Franz-Josef Land	23

When 250 specimens of *Draba* from Franz-Josef Land have all been examined, I shall find it necessary to increase the total number of species to twenty-five or twenty-six.

A larger flora must not be expected here, because we have only six insects—moths, butterflies, and bees being all absent. Flocks of geese passed over; we may therefore suppose there is better land farther to the north or northwest.

Seedling plants of *Cochlearia* were in abundance in June on the débris of Gully Rocks and on débris of Cape Flora in September.

No other plant reproduces itself by seed. *Cochlearia* is self fertilized. The highest temperatures during the 1895 summer were on July 4:

Sandy soil, mid-day	+ 48° F.
Rill, 6 P.M.	+ 47° F.
Air (in shade), 6 P.M.	+ 45° F.

The above readings were taken on Cape Gertrude, ten feet above the sea-level.

Cape Barents differs considerably from all the other localities visited. Here, on September 9, 1894, when the rocks were as free from snow as at any time during the summer, one solitary flowering plant existed with a few lichens and mosses. There is neither talus nor raised beach here. Scarcely any flowering plants could exist on the bare rocks and boulders, which are exposed to all winds, particularly to the prevalent easterly blast.

Cape Gertrude has a comparatively long and wide beach, with pools of water. Excepting *Saxifraga stellaris*, L. var. *vivipara* (which grows on a little stony bank on the raised beach about twenty feet above sea-level and about four hundred yards from the edge of the present sea-shore), there is nothing remarkable to be found. We camped on this cape for a week, making a thorough search, the result being sixteen species—that is, two-thirds of the entire flora.

Cape Flora. Here I had more opportunities for collecting than else-

A THOUSAND DAYS IN THE ARCTIC

where, although the boat journey and Cape Gertrude camp took up the best part of the summer. There are many suitable spots where one might reasonably look for Ericacæ, *Oxyria*, *Salix*, and Cyperacæ, all of which are absent.

The flora is quite as disappointing as that of Cape Gertrude. Lichens and mosses, though mostly barren, make a good show here. There are, however, very few species. (Sixteen species only of Phanerogams.)

Bell Island. Here there is a wide stretch of raised beach, unsuitable for vegetation, excepting certain low forms in the numerous pools of melted snow. Stunted and starved plants of fifteen species contrive to maintain an existence wherever there is sufficient soil.

Mabel Island. Facing south, with high rocks to moderate the northerly winds, we have here a suitable beach for an improved flora. In two hours I found more forms than on the other capes already mentioned, including the most rare and beautiful little grass *Pleuropogon Sabinii*, R. Br., originally discovered on Melville Island by Sir Edward Sabine, and afterwards on other islands, etc., in that region, but not in Grinnell Land, Greenland, or Spitzbergen.

Pleuropogon is the only genus peculiar to the Arctic regions. There are also other plants of some interest here—viz., *Luzula campestris*, var. *congesta*, *Lej. f. glabra*. (Typical *L. congesta* is found in Greenland and Grinnell Land but not in Melville Island or Spitzbergen.)

I found this* on Cape Stephen and on Cape Neale also. *Saxifraga stellaris*, L. var. *vivipara*, is here, but although the soil is apparently quite as suitable as that of Cape Gertrude and Cape Stephen, it is very stunted. This plant is very rare in Greenland, where it has been seen between 70° and 78° N. by Sabine on the east coast.

On the west coast it was found by Dr. Robert Brown at Jacobshaven and at Egedesminde by Nares's Expedition (Hart), and Taylor found it on Kickerline Islands in Cumberland Gulf (east Arctic America).

In Spitzbergen it is not rare.† All the above localities are in much lower latitudes than the Franz-Josef Land stations.

Potentilla sp.—Of this I found only one plant. There are probably two or three species here which I did not see. The time at my disposal was too short to enable me to examine more than a part of this interesting locality. Here are pools of water and a rill, larger than any others on this part of Franz-Josef Land. On the banks of these waters one cannot fail to observe the absence of Cyperacæ.

Juncus biglumis is here, though smaller than on Cape Stephen and Cape Neale.

Cape Stephen (latitude 80° 3' 52" north). On the southeastern side there are more species than on any other cape, the only absentee being *Plex-*

* Variety.

† *Saxifraga stellaris*.

APPENDIX

ropogon.* On the other side of the cape it is extremely barren. There is a fine corrie on this side from which run numerous rills over a flat beach, bare of vegetation. The summit of the cape is a plateau a little under the snow-line quite free from snow on its southern half. A starved moss and lichen here and there represent the plant-life. The aneroid read 1010 feet, a little too high, as was found by observation.† On the east side is a pool 120 yards long by 60 yards wide. At its southern end there is a spongy, mossy depression. Such a spot as *Eriophorum* might be looked for, but search was in vain.

Cyperaceæ again are absent. Even *Juncus biglumis* and *Luzula congesta*, *Lej.*, have found the drier bank above more favorable to their growth. On the moist grassy bank sloping away from the pool *Potentilla* is much more luxuriant than elsewhere in this part of Franz-Josef Land.

Cooke Rocks (latitude $80^{\circ} 3' 45''$ north), under high precipitous rocks between Cape Stephen and Cape Grant. It was on this beach that I first noticed *Potentilla*—about a dozen plants on dry, sandy soil, close to the crumbling edge. This plant and *sagina* were the only notable species here. (There are nineteen species here.)

Cape Grant (latitude $80^{\circ} 2' 45''$ north). The soil on the southeastern side is kept damp by the frequent rills, and well manured by the numerous birds which breed on the cliffs above.

Cochlearia anglica, *L. var fenestrata*, *R. Br.*, abounds on the rich soil on this side. All the plants are very luxuriant here.

On the other side there is a corrie; at its base an old moraine; and below that raised sandy beaches on which a few plants find a home. If there were as much sunshine on this side we should probably find a richer flora than on the other; the rich soil not seeming to be so favorable to the number of species as it is to the luxuriance of the few.

Total number of species here, seventeen, including *Cerastium alpinum*, *L. var. uniflorum*. This last form is apparently confined to Cape Grant, where beautiful plants are plentiful in one place.

Cape Crowther (latitude $80^{\circ} 10' 11''$ north). There is a good wide beach with small mossy pools. Nothing here requires special mention. Fifteen species only are to be found.

Cape Neale (latitude $80^{\circ} 16' 29''$ north). The southern side has numerous small rills spreading along the lower beach, chiefly from the glacier. There are patches of grass of inconsiderable extent. In one place where the grass is well watered there is a carpet-like stretch of verdure.

Among the grass and saxifrages I found *Stellaria* in bloom, not more than six plants, however. In no other place does this plant flower. Here the *Stellaria* is smaller than usual. *Luzula congesta*, *Lej.*, is also very small

* *Pleuropogon* was named by Robert Brown. *Dr. Robert Brown*, his namesake, on Nares's Expedition, was no relation.

† 792 feet.

A THOUSAND DAYS IN THE ARCTIC

here. *Juncus biglumis* is finer here than at the other stations and also more plentiful.

All these plants are confined to a space of twenty square yards.

Saxifraga oppositifolia is much scarcer here than on any other cape. It is worthy of remark that this plant is scarce on all the three most western capes. There is more on the plateau at the summit of Cape Neale (altitude 700 feet by aneroid) than there is on the beaches below. There is apparently no reason why this should be so. Similar soil is to be found in both situations. Poppies are plentiful on the summit, which in its southern part is quite free from snow. A rill and a pool of water here do not favor the growth of any phanerogams (*Confervæ* grow sparingly in them).

Here on Cape Neale we have reached as far in a westerly direction as the flora is known to extend. There is no beach on either Cape Ludlow or Cape Lofley, and, as far as we could see, Cape Mary Harmsworth is very similar. What is beyond remains for the future to disclose.

I need only mention the plants which are generally distributed—that is to say, on every cape and island from Cape Gertrude to Cape Neale, both included. They are all common in Arctic regions generally.

Ranunculus nivalis, L. *Papaver alpinum*, L. *Cardamine bellidifolia*, L. *Draba alpina*, L. *Cochlearia anglica*, L. var. *fenestrata* (Br.). *Stellaria* sp. *Cerastium alpinum*, L. *Saxifraga oppositifolia*, L. *Saxifraga caespitosa*, L. *Saxifraga cernua*, L. *Saxifraga rivularis*, L. *Saxifraga nivalis*, L. *Alopecurus alpinus*, L. *Poa flexuosa*, Wahl. *Poa vivipara*, and *Dupontia Fischeri*, R. Br.

The most noteworthy facts in relation to the Franz-Josef Land flora are:

The presence of *Pleuropogon* and the absence of Compositæ, Ericaceæ, *Pedicularis*, *Oxyria*, *Salix*, and Cyperaceæ.

(Signed)

HARRY FISHER.

February 19, 1896.

APPENDIX

SYNOPSIS OF WIND FORCES AND DIRECTION FOR MAY, JUNE, AND JULY, 1895

Direction of Wind	May. No. of hours observed	Average force per hour (Beaufort's notation)	June. No. of hours observed	Average force per hour (Beaufort's notation)	July. No. of hours observed	Average force per hour (Beaufort's notation)	Total No. of hours observed	Mean average force per hour (Beaufort's notation)
N. to N.E.	68	4.7	44	3.7	36	4.3	148	4.3
W.S.W. to N. by W.	200	3.7	232	3.0	164	2.9	596	3.2
N.E. by E. to S.	120	3.4	108	2.3	76	2.5	304	2.8
S. by W. to S.W. by W.	28	1.5	32	1.5	16	1.5	76	1.5
Calm	56	0.0	28	0.0	196	0.0	280	0.0
Winds which tend to open out western portion of the Barents Sea.								
N. to N.E. and W.S.W. } to N. by W.	268	3.9	276	3.2	200	3.1	744	3.4
Winds which tend to close western portion of the Barents Sea.								
N.E. by E. to S.	120	3.4	108	2.3	76	2.5	304	2.8
Neutral winds.								
S. by W. to S.W. by W.	28	1.5	32	1.5	16	1.5	76	1.5
N. to N.E.	68	4.7	44	3.7	36	4.3	148	4.3
N.E. by E. to S.	120	3.4	108	2.3	76	2.5	304	2.8
S. by W. to S.W. by W.	28	1.5	32	1.5	16	1.5	76	1.5
W.S.W. to N. by W.	200	3.7	232	3.0	164	2.9	596	3.2
Calm	56	0.0	28	0.0	196	0.0	280	0.0
N. to N.E. and W.S.W. } to N. by W.	268	3.9	276	3.2	200	3.1	744	3.4
Totals and Means	472	3.2	444	2.6	488	1.7	1404	2.5

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SYNOPSIS OF WIND FORCES

Direction of Wind	No. of hours observed	Average force per hour (Beaufort's notation)	No. of hours observed	Average force per hour (Beaufort's notation)	Total No. of hours observed	Mean average force per hour for the two months
N. to N.E.	64	4.6	84	3.9	148	4.2
N.E. by E. to S. . .	174	3.1	188	3.0	362	3.0
S. by W. to S.W. } by W. }	12	1.3	16	2.6	28	2.0
W.S.W. to N. by W.	120	2.3	80	3.6	200	2.8
Calm	100	0.0	72	0.0	172	0.0
N. to N.E. and W. } S.W. to N. by W. }	184	3.1	164	3.8	348	3.4
Grand total and } average means for } all directions . . }	470	2.4	440	2.8	910	2.6

AUGUST 1ST, 2D, 3D, AND 4TH

Observed at Elmwood

Winds	Hours observed	Force
S.E. . . .	4	4.000
E.S.E. . .	56	3.928
	60	3.933 mean force

APPENDIX

POSITIONS OF CAMPS, ETC., ON SLEDGING JOURNEY

APRIL 16 TO MAY 13, 1895

Date	Observations	Latitude N.	Longitude E.	Distance travelled in geographical miles	Variation E.
		° ' "	° ' "		°
April 16 .	—	79 57 30	00 00 00	—	—
" 16 .	⊙ D. R.	80 07 00	1 14 42	18	—
" 17, 18	⊙ O	80 09 52	2 17 00 D.R.	11	—
" 18, 19	⊙ D. R.	80 12 00	2 34 00	3½	—
" 20, 21	⊙ D. R.	80 17 30	2 33 00	35	—
" 21 .	⊙ D. R.	80 22 45	2 40 00	5½	—
" 22, 23	⊙ D. R.	80 32 00	3 01 30	11½	—
" 25, 26	⊙ O	80 35 20	3 35 56	7½	15½
" 27 .	⊙ O	80 47 18	3 35 56 D.R.	12	—
" 28, 29	⊙ D. R.	80 52 45	4 15 24	9	—
" 30 .	⊙ O	81 00 36	4 11 52	8	17
" 30 .	⊙ D. R.	81 04 36	4 10 51	} 10½	—
May 1 .	⊙ D. R.	81 08 00	4 22 54		—
" 2, 3	⊙ D. R.	81 19 30	5 18 18	14½	—
" 4 .	⊙ D. R.	81 09 15	4 26 24	13½	—
" 4, 5	⊙ O	80 50 01	4 02 38	27	16½
" 6 .	⊙ O	80 40 37	3 45 05	11	16½
" 7 .	⊙ O	80 32 11	2 50 28	15½	18½
" 8 .	⊙ D. R.	80 21 00	2 01 00	14½	—
" 9 .	⊙ D. R.	80 19 45	1 42 00	3½	—
" 10 .	⊙ O	80 16 48	1 24 16	4½	{ 20 } { 20½ } 20½
" 11, 12	⊙ D. R.	80 05 00	0 43 00	14	
" 13 .	—	79 57 30	00 00 00	11½	—

Geographical miles . . . 260½ of 6107 ft.

Statistic miles . . . 301 of 5280 ft.

Travelling days, 21; 12.4 geographical miles per day; 14.2 statute miles per day.

⊙ = camp.

O = observation for position.

D. R. = Dead reckoning.

These distances are *direct*, and in all but two instances are measured *on the map straight* from one camp to another. Nothing is allowed for windings to avoid rough ice, etc.

ABSTRACT OF WEATHER ON SLEDGE JOURNEY NORTH
APRIL 16 TO MAY 13, 1895

APRIL

- 16th. Light N.W. airs. Cloudy, overcast, and misty throughout.
- 17th. Light N.W. airs. Cloudy. Misty throughout.
- 18th. Calm throughout. Fine but misty.
- 19th. Gentle E.N.E. wind. Fine but cloudy.
- 20th. Light airs and winds from N. Fine and clear.
- 21st. Gentle to moderate S. and S.E. winds. Fine, very clear weather until 8 P.M., then clouded over and very fine snow fell all night.
- 22d. Gentle S. and W. and moderate S. W. winds. Overcast and foggy, with snow throughout day. Cleared slightly at noon.
- 23d. Fresh E.N.E. winds increasing to moderate fresh, and strong gale. Overcast and misty throughout.
- 24th. Strong to fresh N.E. gale, decreasing to moderate gale at 11 A.M. and gentle N.N.E. wind at 5 P.M. Snowing all the previous night and until noon of 24th. Moderate gale from N. at midnight. Snow driving thickly throughout gale and whenever the wind-force exceeded force 3. Mist hanging low down.
- 25th. Fresh to light N. wind till 6 P.M. Moderate W.N.W. wind at midnight. Overcast and misty with falling snow in the morning. Fine but misty afternoon.
- 26th. Gentle to light W.N.W. wind. Calm, fine, but misty till noon. From then till midnight fine, clear weather.
- 27th. Moderate E. wind, increasing to a moderate gale at 5 P.M., which rapidly increased to a fresh and strong gale. Fine but misty in the earlier part of day. Overcast and with falling snow from 4 P.M. Snow driving fiercely and thickly throughout. Gusts at storm force (force 11).
- 28th. Strong gale from S.E. decreasing to moderate wind at 4 P.M. Gentle S. wind at 8 P.M., and light S.S.W. airs at midnight. Overcast and misty with falling snow throughout. Gusts at force 10 between 5 and 11 P.M.
- 29th. Light E. airs and calms throughout morning, and overcast and misty with falling snow. Fine and clear weather afterwards.

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- 30th. Light S.E. and S.W. airs and calms. Misty around horizon, thickening in the afternoon. Heavy bank of black cloud to N.W. and W.

MAY

- 1st. Fine and clear at 8 A.M., quickly clouding over, and became overcast at 10 A.M. from S.W., and continued overcast, with thick mist and fog throughout.
Light to fresh and moderate S.W. wind till noon. Fresh E. wind at 4 P.M., increasing to moderate and fresh gale. Snow driving hard and thickly.
- 2d. Moderate S.W. gale at 7 A.M. Strong wind at 11 A.M. Moderate W. gale at 2 P.M., decreasing to fresh breeze at 7 P.M. At midnight moderate S.W. gale. Overcast and misty, with fiercely driving snow and thickly falling sleet until noon; clearing at 3.30 P.M., and becoming again overcast and misty at 8 P.M.
- 3d. Fresh to moderate E. wind from 9 A.M. till noon. -Then a fresh E.N.E. wind. Overcast, misty, foggy weather, with falling snow throughout.
- 4th. From 8 A.M. to 4 P.M. gentle to moderate N.E. and N.N.E. winds. At 6 P.M. moderate N.W. gale. At 10 P.M. moderate to fresh W. gale. Overcast, cloudy weather throughout. Cleared at 8 P.M.
- 5th. Calm, cloudless, fine, very clear weather until 10 P.M. Light S.E. airs at midnight.
- 6th. Light N.W. airs and light to moderate N.N.E. winds. Clear weather throughout.
- 7th. Fresh to strong, moderate, and light N.N.E. winds. Fine, clear weather until 2 P.M., then misty.
- 8th. Calm, overcast, and misty throughout.
- 9th. Light airs and calms throughout. Fine but cloudy and misty generally.
- 10th. Calms and light E. airs till 6 P.M., with fine but misty weather. At midnight moderate S.E. gale and gloomy weather.
- 11th. Fresh to strong and fresh S.E. gale throughout. Fine and clear weather overhead, with cumulus and cirrus clouds.
Thick driving snow lower down, with nimbus clouds around the horizon. From 8 A.M. throughout overcast, with thick falling snow, which was very fine and wet.
- 12th. The gale moderate to force 7 at 7.30 A.M., and at 8 A.M. increased again to force 8. At noon the wind E. force 7. At 4 and 8 P.M. fresh N.N.E. wind, overcast with thick snow till noon. At 4 P.M. fine but misty. At 8 P.M. fine and clear. Snow very fine and wet.

A THOUSAND DAYS IN THE ARCTIC

TEMPERATURES TAKEN ON SLEDGE JOURNEY NORTH

FROM APRIL 16 TO MAY 12, 1896

Fahrenheit

Date	Time	Hourly	Maximum	Minimum	Remarks
April 16	11.30 P.M.	0	0	0	
" 17	11 A.M.	1			
	11.30 P.M.	-1			
" 18	11 A.M.	-10			
	5 P.M.	-5	-5	-15	
	Midnight	-12			
" 19	Noon	-20			
	4 A.M.	4	4	-22	
" 20	4 P.M.	-17.5			
	Midnight	-8	-6	-19.5	
" 21	Noon	-14			
	Midnight	-2			
" 22	Noon	-9			
	7 P.M.	9	9	-9	
	Midnight	8.5			
" 23	10 A.M.	8			
	2 P.M.	7	11	-7	
	5 P.M.	7			
	7 P.M.	4			
" 24	11 P.M.	2			
	7 P.M.	4			
	11 A.M.	2			
	5 P.M.	0			
	7 P.M.	-2			
" 25	Midnight	-10			
	10 A.M.	-12			
	Noon	-10			
	6 P.M.	-12			
	Midnight	-19			
" 26	Noon	-14	-11	-21	
	4 P.M.	-11			
	Midnight	-19			
" 27	Noon	-5	-3	-26	
	4 P.M.	-2			
	8 P.M.	-7			
" 28	4 A.M.	12.5			
	4 P.M.	23.5			
	8 P.M.	24			
	Midnight	21			
" 29	11 A.M.	27	27	4	
	2.30 P.M.	24			
	8 P.M.	7			
	Midnight	2			
" 30	9 A.M.	2	10	2	
	Noon	8			
	4 P.M.	8			
	8 P.M.	2			
	Midnight	-6			

All hourly temperatures taken with a swing thermometer supplied by the Meteorological Office. The maximum and minimum with Carey's case thermometers.

APPENDIX

TEMPERATURES—*Concluded*

Date	Time	Hourly	Maximum	Minimum	Remarks
May 1 . .	9 A.M.	0	0	0	<p>All hourly temperatures taken with a swing thermometer supplied by the Meteorological Office.</p> <p>The maximum and minimum with Carey's case thermometers.</p>
	Noon	10	12	- 9	
	4 P.M.	15			
	8 P.M.	14			
	Midnight	19			
" 2 . .	7 A.M.	19			
	11 A.M.	31			
	2 P.M.	34			
	5 P.M.	32			
	7 P.M.	21			
" 3 . .	Midnight	14.5			
	9 A.M.	19			
	Noon	26			
	4 P.M.	28.5			
	8 P.M.	28.5			
" 4 . .	Midnight	22			
	8 A.M.	11	24	13	
	Noon	16			
	4 P.M.	15			
	6 P.M.	4			
" 5 . .	10 P.M.	2			
	4 A.M.	- 3			
	2 P.M.	10			
	4 P.M.	12			
	8 P.M.	0			
" 6 . .	Midnight	-10			
	4 A.M.	- 8			
	2 P.M.	5	7	-10	
	6 P.M.	4			
	10 P.M.	4			
" 7 . .	2 A.M.	1			
	5 A.M.	2			
	2 P.M.	6	10	- 1	
	8 P.M.	6			
	Midnight	2			
" 8 . .	8 A.M.	6			
	4 P.M.	18	19	6	
	8 P.M.	14			
	Midnight	7			
	8 A.M.	21			
" 9 . .	4 P.M.	16			
	8 P.M.	10			
	Midnight	6			
	4 A.M.	7			
	Noon	15			
" 10 . .	6 P.M.	9	17	7	
	Midnight	9			
	4 A.M.	12			
	8 A.M.	15			
	6 P.M.	13			
" 11 . .	Midnight	13			
	8 A.M.	14			
	Noon	15			
	4 P.M.	20			
	8 P.M.	14			
" 12 . .					

A THOUSAND DAYS IN THE ARCTIC

The zoological collection promises to be very interesting, but at present it is difficult to say much, since the work of assorting and that of identification is not yet complete. I have received no report yet on the smaller life of Franz-Josef Land Archipelago. I have, however, received the following information—but any list is merely provisional: The collection chiefly consists of smaller vertebrate and invertebrate forms. Richest of all will perhaps be the micro-organisms, upon which a considerable time was spent all through the winter months, many specimens having been drawn from living or freshly mounted preparations.

Among Protozoa, the Infusoria are well represented. There are sponges and collenterates, the latter including several interesting corals. Worms are rich in the number of species, and include sipunculids, Rotifers, Polyzoa, leeches, chactopods, nematodes, etc. Sea-urchins and brittle-stars were very plentiful, and the collection also includes several starfish, sea-cucumbers, and feather-stars. The sea-cucumbers were mostly obtained from the stomachs of walruses, in which were also found the interesting worm known as *Priapul* and various mollusks. Crustaciæ were obtained in large numbers. Insects are but poorly represented by three or four species. There are no moths or butterflies. Five or six species of acarina and spiders were obtained. Sea-spiders, or pycnoyonida, are well represented. To this invertebrate list has to be added a considerable number of bivalves and gasteropods. Among vertebrate, sea-quirts, appendicularia, and probably four species of fish complete the series, apart from birds and mammals. The collection is mostly marine, and was obtained from all depths down to 243 fathoms. The greater portion, however, consists of animals obtained near the shore, at depths varying down to eighteen and twenty-six fathoms. The interesting discovery of bones of walruses, cetaceans, and deer on the gigantic raised beaches will be dealt with by the geologist.

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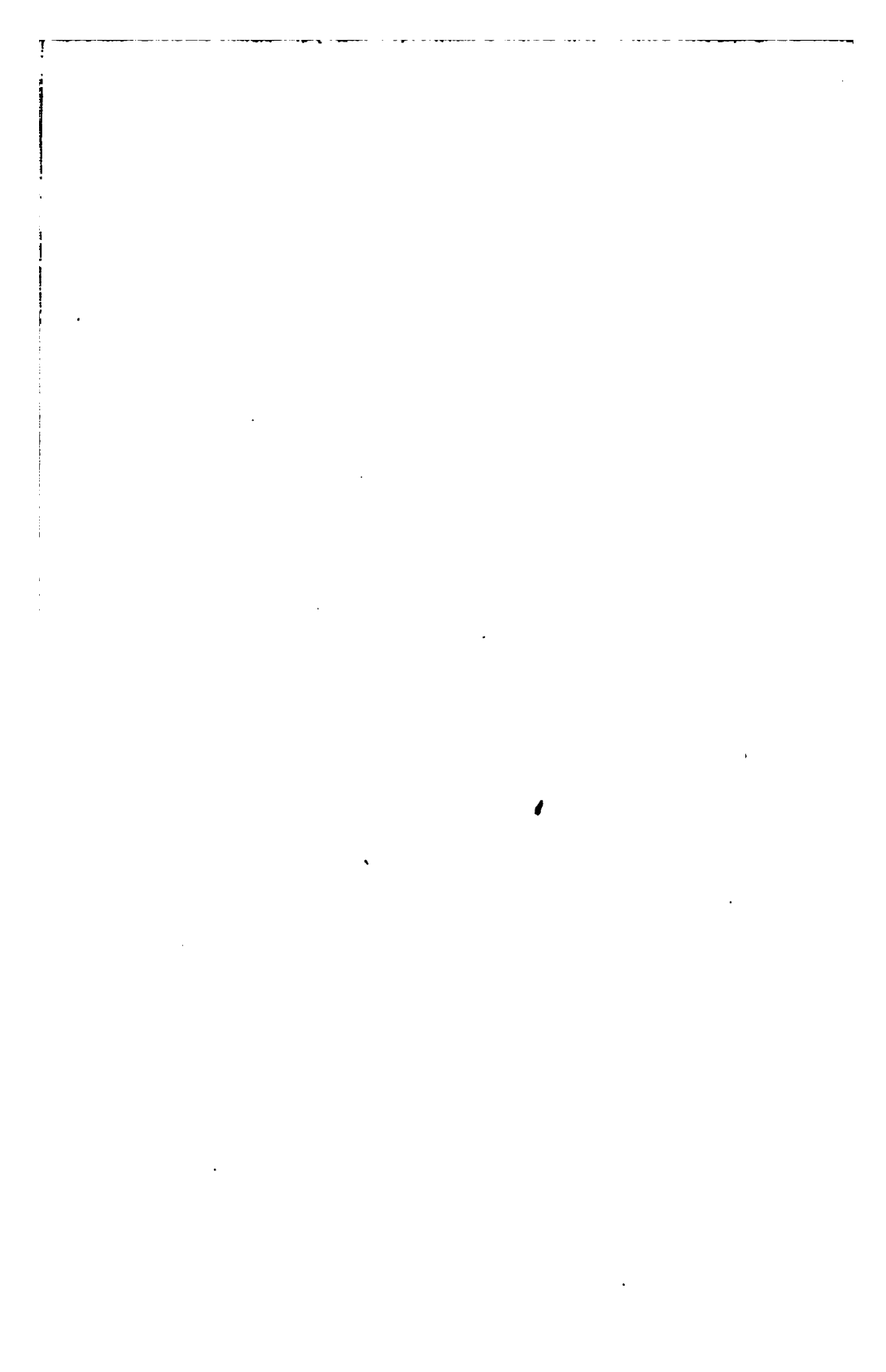
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